Vol. XXV FEBRUARY 1931 No. 2

The EXCAVATING ENGINEER

IN THIS ISSUE:

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On Indiana 67

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Excavation for 1931 Highway Construction

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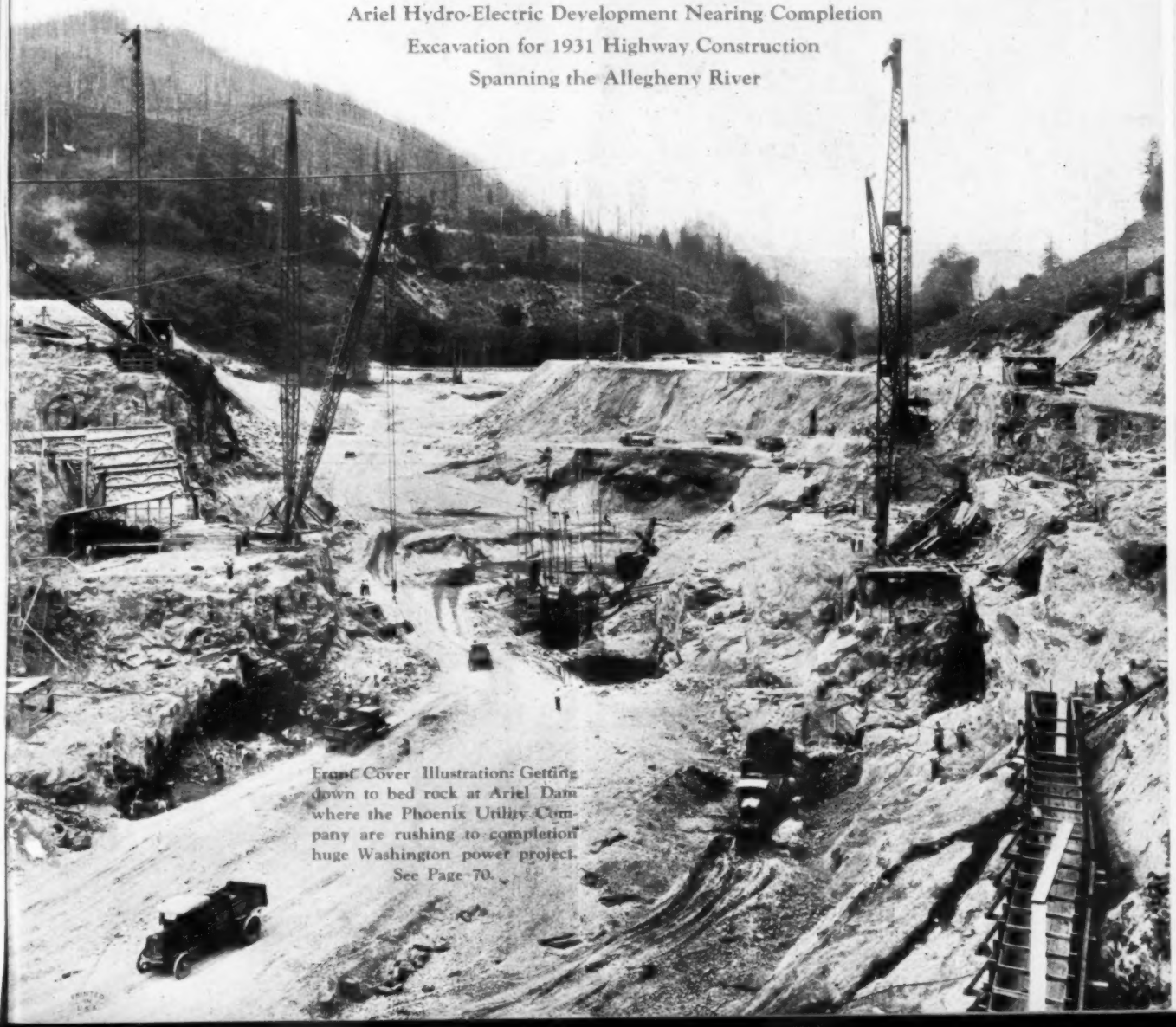

Front Cover Illustration: Getting down to bed rock at Ariel Dam where the Phoenix Utility Company are rushing to completion huge Washington power project. See Page 70.

1/2-
yard
5/8
3/4
7/8
1
1-1/4
1-1/2
1-3/4
2
2-1/4
2-1/2
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Gas
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lectric
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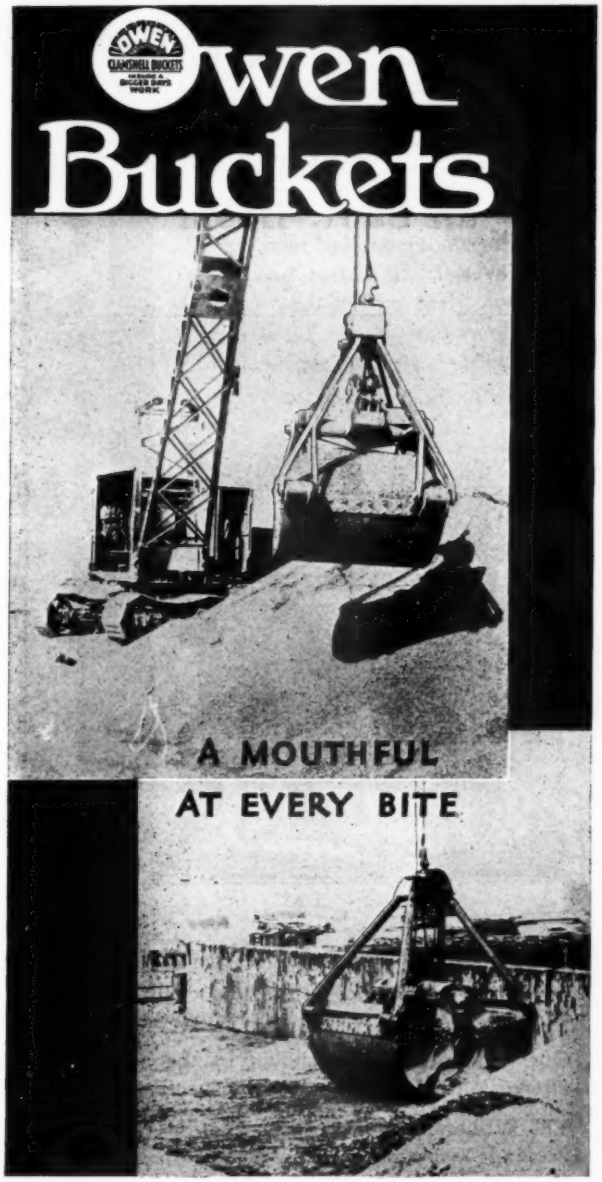

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Vol 25 — FEBRUARY 1931 — No. 2

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PUBLISHED MONTHLY BY

The Excavating Engineer Publishing Co.

F. O. Wyse, Manager-Editor Arnold Andrews, Associate Editor
E. M. Heuston, Advertising Manager.

South Milwaukee, Wisconsin, U. S. A.

ADVERTISING REPRESENTATIVES

H. B. KNOX, Jr., 101 Park Ave., Room 1126, New York, N. Y.

V. G. CLYDE, 4446 No. Lincoln St., Chicago, Illinois.

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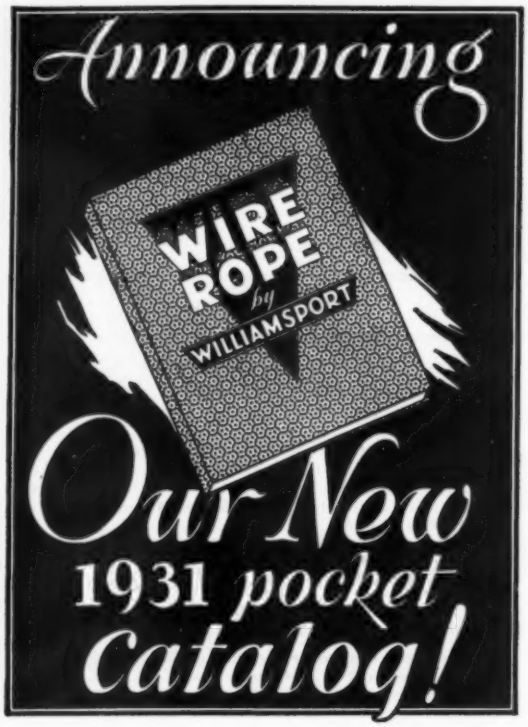

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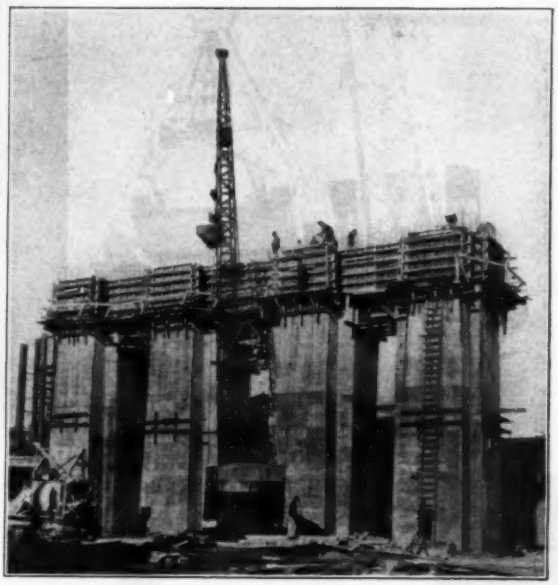

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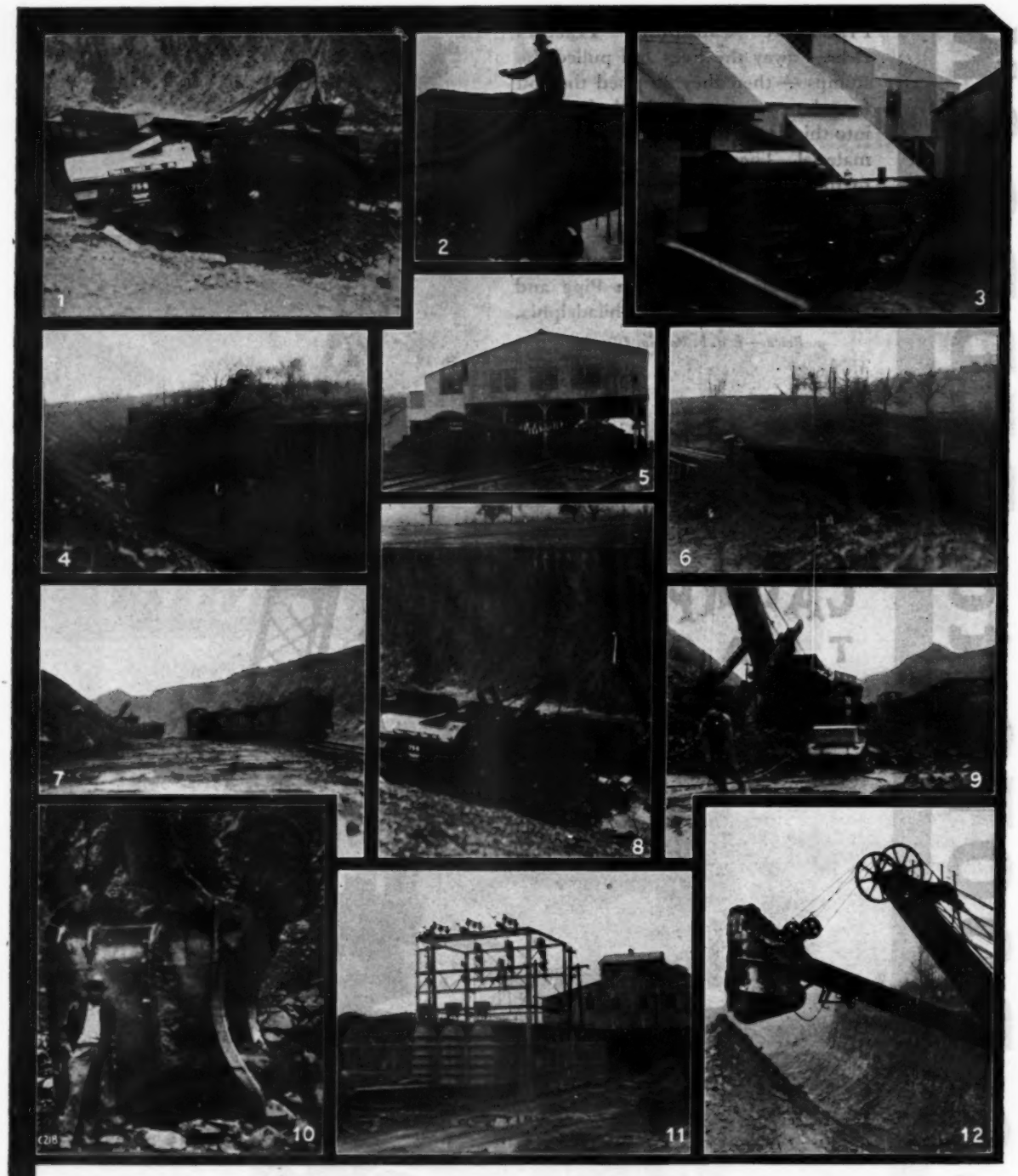


A Picture Story of Strip Mining at St. David

1. Bucyrus-Erie 75-B loads the coal to Sanford-Day automatic dumps. 2. Empties are dropped into the tipple by gravity. 3. Plymouth gas locomotives haul coal from pit. 4. Bucyrus-Erie 750-B 12-yard electric stripper removes overburden. 5. From modern tipple, loads drop down into storage yard by gravity. 6. Track runs down hill one approximately one-half of one per cent grade from pit to plant. 7. Automatic spring switches carry trains to destination without switch tenders or brakemen. 8. Simplex electric cable carries current from power line on bank to electric shovels. 9. Ingersoll-Rand compressor furnishes air for Gardner-Denver Jackhammers used to drill coal. 10. Pit Boss P. E. Atchley shows you the size of the 750-B dipper, which takes twelve yards at a bite. 11. Tipple is operated with electric power from this transformer station. 12. 70-foot cuts in overburden to a depth of 65 feet have been handled successfully at St. David with the 750-B.

The EXCAVATING ENGINEER

Vol. XXV FEBRUARY 1931 No. 2

Modern Mining Methods

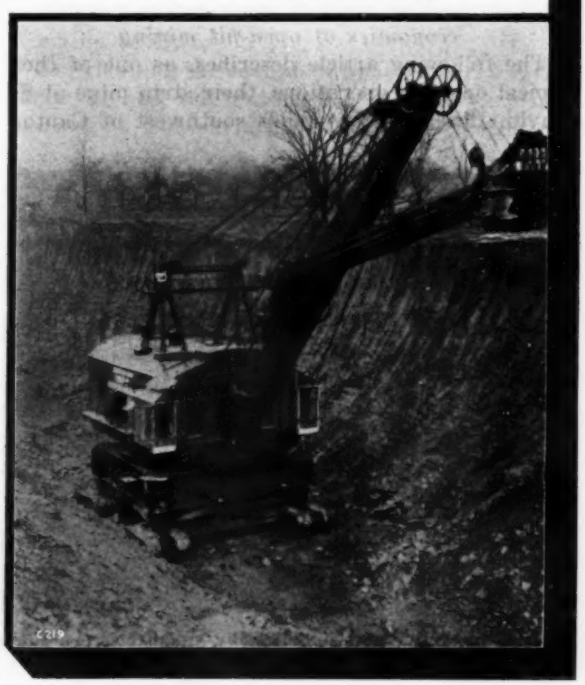
help place Truax-Traer among Nation's Leaders in Coal Industry

St. David, Illinois Mine Described as typical of Company's many open pit operations

BY THEIR outstanding progress in the past few years, Truax-Traer Coal Company have placed themselves among the leading figures in the coal industry. They now own and operate in their own name or through their subsidiaries, extensive properties in North Dakota, Illinois, West Virginia, and Saskatchewan.

In North Dakota these people have established themselves as leaders in Lignite production by the operation of large strip mines at Velva, Kincaid and Wilton. E. M. Truax, a pioneer in Lignite production, directs all Dakota operations from a central office at Minot, where general sales offices for the Dakota branch are also maintained. Illinois strip mines consist of a combination of properties in Jackson County, formerly operated by the Forsyth Coal Company and the Black Servant Coal Company, also a new property in Fulton County, the St. David Mine, which is later described. A. M. Nielsen, with offices at Elkville, is General Superintendent for Illinois. In West Virginia, their subsidiary, the Cabin Creek Consolidated Coal Company, is operating in the Pilgrim Dorothy and Acme Splint seams, producing a large tonnage of high quality coal from five drift mines in Kanawha, Boone and Raliegh counties. Garner Williams, formerly of Illinois, is now Superintendent of West Virginia operations. The most recent addition to company holdings is a new strip mine in Estevan, Saskatchewan, Canada, which is now producing Lignite by the strip method, under the

Stripping at St. David is handled by a giant Bucyrus-Erie 750-B, 12-yard electric shovel, which digs 4,000 to 5,000 cubic yards per 8-hour shift.



At their De Soto operations, Truax-Traer also strip with a Bucyrus-Erie 750-B and load to Sanford-Days with a Bucyrus-Erie 75-B.

direction of E. W. Garner. Very substantial reserve tonnages assure long life to all of these properties. The diversification of territory, excellence of product and preparation and the efforts of live sales representatives in practically all of the larger middle west cities keep the properties operating well up to capacity at all times.

Bucyrus-Erie giant stripper makes possible economies of open-pit mining

The following article describes, as one of their typical open-pit operations, their strip mine at St. David, Illinois, a few miles southwest of Canton.

Here the Sanford-Days automatically dump their loads into the hopper, whence the coal is conveyed to the tipple.

Truax-Traer have in their property at St. David, Illinois, approximately 2,500 acres of coal averaging about 4 feet 10 inches in thickness. The average overburden is 40 feet with the maximum depth running up to 65 feet. Originally the property was leased with the idea of working it as an underground mine. Development of the modern large strippers with their great reach and lifting range together with their enormous output capacity at low operating costs, made it possible to discard plans for this more expensive underground method and operate as a strip pit.

A Bucyrus-Erie 750-B shovel on caterpillar-type mountings was installed, carrying a 95-foot boom and 12-yard dipper. The machine is powered by General Electric motors with Ward-Leonard control and regenerative braking. Its maximum dumping height is 75 feet, and dumping radius at maximum height is 101 feet. It will dig at a maximum radius of 113 feet, leaving a level floor of 65½ feet radius. Included in unique features of construction which make possible its remarkable reach, capacity and speed, are two equalized twin hoist ropes, one attached to either side of the dipper, eliminating the bail and extending over twin boom sheaves to the hoist drum, which is driven by two powerful motors. Twin swinging units, two sets of boom suspension tackle, twin A-frames, a two-part cast-steel dipper without a rivet in it, are among the other interesting developments contributing to the success of this giant machine.

45-second cycle averaged with 12-yard shovel

At the time of our visit, the stripper was digging a 55-foot bank with a cut about 63 feet wide. At some places it had taken care of 65-foot banks with cuts as wide as 70 feet. The cycle was averaging 45 seconds, according to our stop watch, and moving up took less than two minutes. The digging was half hard shale, half hard clay. The shale was blasted fairly well, though there were places where the shots did not seem to have reached to very good advantage.

Operator Bill Ayers was pulling the levers up in the operator's room, which is about 28 feet from the floor of the pit. Bill used to handle a Bucyrus-Erie 320-B down at Dawson, Kentucky. "This baby is just as fast as the 320," said Bill, "and she's easier to handle. She digs right along without a whimper and some of this bank's pretty hard. We had some heavy rains this spring and the bank came down in a narrow cut and just about buried one side of her. But she crawled right through it just as though that pile of dirt wasn't there."

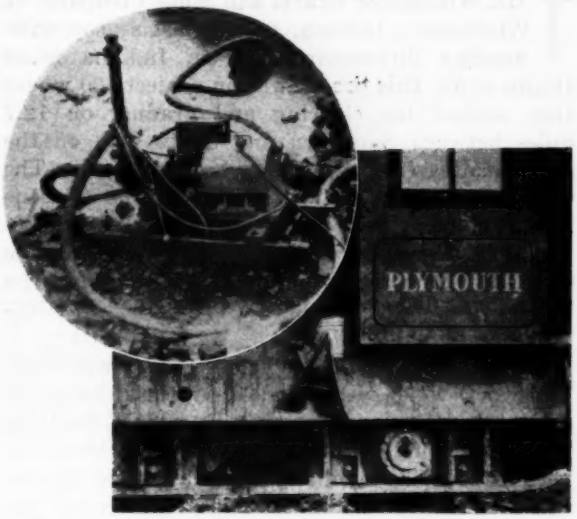
The crew consists of an operator, oiler, and two pitmen. Three shifts of eight hours each are worked.

4,000 to 5,000 yards stripped per 8-hour shift

At St. David, the 750-B averages about 4,000 cubic yards per shift in the heaviest overburden. In good digging with a 40-foot bank, Pit Foreman Atchley tells us they get an average of 5,000 yards per shift. No special system of stacking is used, overburden standing well in the spoil pile and being piled over as it comes.

In carrying the Simplex electric cable along with the shovel, use is made of the electric power cable reel carried beneath the shovel. At the end of the cable range, however, the cable must be pulled up and a new connection made to one of the outlets at the top of the bank. This is done by dropping the rope from the Armstrong well drill working on the bank, attaching it to the end of the electric cable and pulling it up to the top of the bank, where it is anchored and connected with the power line.

This Armstrong crawler-mounted electric drill also puts down hole for blasting the overburden. The formation at St. David carries a two-foot slate seam under the shale and holes are drilled till they hit this layer of slate. They run from 55 to 57 feet deep and the Armstrong puts down from 90 to 123 feet per shift, depending on the material. Blasting is with E. L. 254 du Pont Special dynamite in sticks 5 inches by 16 inches, weighing 12½ pounds to the stick. Seventy-five pounds are loaded per hole, and this charge shakes up the bank nicely without bringing it down.

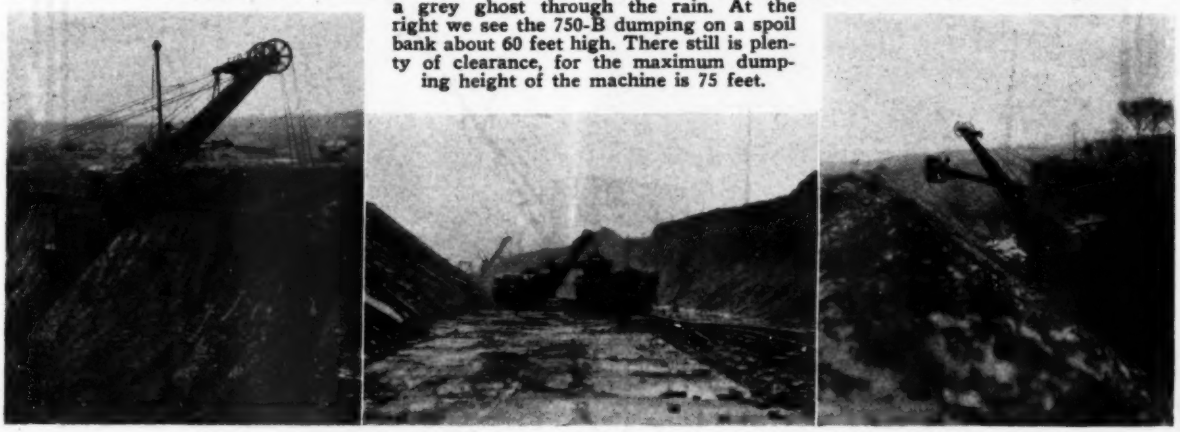


Anchor Rerailers are carried on the Plymouths, though with the well-kept track they need seldom be used. Above is one of the electric dewatering pumps used in the pit.

For cleaning the coal after the stripper, a Caterpillar 30 and LaPlant-Choate bulldozer are used effectively. The surface of the coal is quite level

(Continued on Page 98)

This bank is 55 feet high, but at the left you will notice the 12-yard dipper of the 750-B easily cuts clear to the top; the machine digs a maximum cut of 92½ feet. Behind the boom may be seen the Armstrong electric drill putting down hole. In the center the 3½-yard 75-B loads to Plymouth-drawn Sanford-Days while the 750-B looms up in the background like a grey ghost through the rain. At the right we see the 750-B dumping on a spoil bank about 60 feet high. There still is plenty of clearance, for the maximum dumping height of the machine is 75 feet.



On Indiana 67

Winchester Gravel and Stone Company moves 115,000 yards for new grade on Vincennes — Indianapolis Highway

THE Winchester Gravel and Stone Company, of Winchester, Indiana, started last season with another dirt-moving job on Indiana State Highway 67. This time it was on project 190 where they subbed the clearing and grading on 12.7 miles between Sandborn and Switz City on the route leading from Vincennes to Indianapolis. The outfit made their headquarters at Lyons (Greene County), about midway on the job. The 115,000-yard job was a sub from The D. A. Y. Construction Company, of Franklin, who bid the job for the paving, which followed closely behind the grading.

Dragline Handles Over 86,000 Yards

About three-fourths of the excavation was dragline work which was handled by the Winchester Gravel and Stone Company's Bucyrus-Erie 1030. The other fourth was grader work on which they used three Ball wagon blades and a 10-foot Adams. Monarch Fiftys furnish the motive power for this blade work. There was also a 1020 International tractor used for miscellaneous work on the job. As slab was laid at once by the D. A. Y. outfit, careful compacting was required and a Huber steam roller kept the fills packed as they were made. Work was started by the Winchester crews on March 17th and was due for completion August 15th. The material was mostly heavy, sandy loam which made fairly easy digging but did not heap well enough in bucket or hauling equipment to favor unusual production records.

Looking back over the grade behind the dragline. Not much left here for the blade to handle.

1172 Yards to Trucks in 11 Hours

There was about 6,000 yards of cast, and the balance of the dragline work was loaded and hauled. Hauling equipment consisted of five International trucks with a Ford for utility work.

Shifts are 11 hours, and when we visited the office (April 18th), an output of 926 cubic yards

1030 Bucyrus-Erie dragline cutting grade on 67.

in one shift stood as a record for Operator Edgar Wysong, who put the 1030 through her paces. Mr. Wysong, by the way, just made his start at the levers, previously having worked as oiler for Henry Mixton. Operator Mixton set a mark on the 1929 contract on 67 between Portland and Albany of 1172 cubic yards loaded with the 1030 dragline to trucks in a single shift.

Gasoline consumption for the 1030's Wisconsin motor ran from 35 to 40 gallons per shift.

April Showers Make Soft Going

Due to heavy spring rains, the 1030 and the trucks had some heavy going early in the season, but there was not much of this during the drier summer months.

The two heaviest cuts in the job, one near Lyons and one near Sanborn, ran about 6,000 cubic yards excavation in about 800 lineal feet.

W. H. Fudge, General Manager for the Winchester Gravel and Stone Company, was on the job in person, assisted by Foreman Clarence Bragg. Both are enthusiastic about the digging ability and reliable service given by the 1030, and under their able supervision the job came along nicely and was finished well ahead of schedule.

Mr. Short, Walter Short!

Walter Short, onetime shovel operator for Shaw-Bertram Lumber Company of Squaw Valley, Ore., is apparently "among the missing." Operator Short not long ago remembered us with an interesting photograph which we reproduced in the November number and our check in payment for the use of this picture has been returned by postal officials—reason: "unclaimed." Can any of our readers give us this contributor's present address? Thank you.

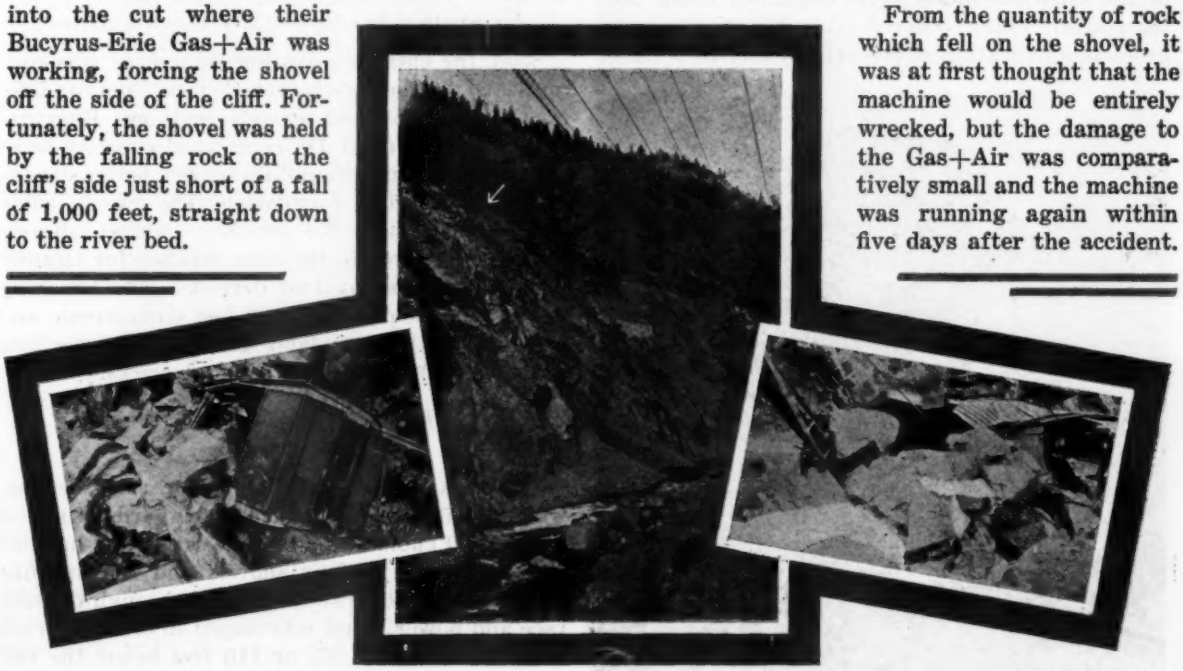
Heavy Rock Slide in Feather River Canyon Forces Shovel Over Side of Cliff

A very unfortunate occurrence happened on Granfield, Farrar & Carlin's California state highway job in the Feather River Canyon on December 5th.

The work involves the moving of approximately 270,000 cubic yards of rock. On December 5, without warning, about 20,000 cubic yards of rock slid into the cut where their Bucyrus-Erie Gas+Air was working, forcing the shovel off the side of the cliff. Fortunately, the shovel was held by the falling rock on the cliff's side just short of a fall of 1,000 feet, straight down to the river bed.

Most regrettable were the deaths of Theodore Thornton, operator, and John Shiels, nephew of Mr. Carlin, one of the contractors, who were both killed in the slide. The men were hurled off the machine over the cliff's side and it was with considerable difficulty that their bodies were removed from the stream bed hundreds of feet below.

From the quantity of rock which fell on the shovel, it was at first thought that the machine would be entirely wrecked, but the damage to the Gas+Air was comparatively small and the machine was running again within five days after the accident.



In the upper left hand corner of the center view the dangling shovel can be seen as it clings fearfully to the edge of the cliff about a thousand feet above the river bed. The illustration at the left shows the perilous angle at which the damaged Gas+Air finally came to rest. The mass of rock which crashed into the side of the machine with such tragic results is shown at the right.

Ariel Hydro-Electric Development Nearing Completion

Phoenix Utility Company builds dam 70 miles from the sea with foundations 74 feet below sea level.

By R. W. Preston

THE MANY difficulties in connection with the construction of the Ariel Hydro-electric Development on the Lewis River in the State of Washington have been overcome, the excavation to a point 74 feet below sea level and 126 feet below the stream bed has been completed, the foundation prepared and the concrete dam is now built to a point 306 feet above the foundation. All this has been done since the closing of the cofferdam on June 25th of 1930.

The foundations for the power house have also been completed and the building is now finished up to the level of the control room floor. One of the 62,000-horsepower turbines is partly erected and the turbine which will operate the house generator is also partly installed.

The North Fork of the Lewis River has its source under the volcanic cone of Mt. St. Helens of the snow-capped Cascade Range in southwestern Washington. It flows through eroded canyons of volcanic andesite and basalt over a gravel channel to the Columbia River. The early fall floods and the glacial "milky" colored river of early summer give some indication of the prehistoric water power which carved the hard basalt and which filled the gradually subsiding cleft with glaciated gravel.

1¼-yard Bucyrus-Erie loading to White trucks from pit of glacial gravel. Tunnel shovel loading rock to skips in foreground.

The contractor for the work is the Phoenix Utility Company. A tunnel, 1,462 feet from portal to portal, 25 feet wide with an arched roof 25 feet high, by-passes the river. It is concrete lined for ultimate capacity. Not a roof timber was necessary in the bore. It is to be plugged with concrete behind steel gates when the reservoir is filled.

Two rock-filled timber crib dams cut the river flow and back water from the dam site. The upper is 1,150 feet long with an emergency spillway 250 feet wide.

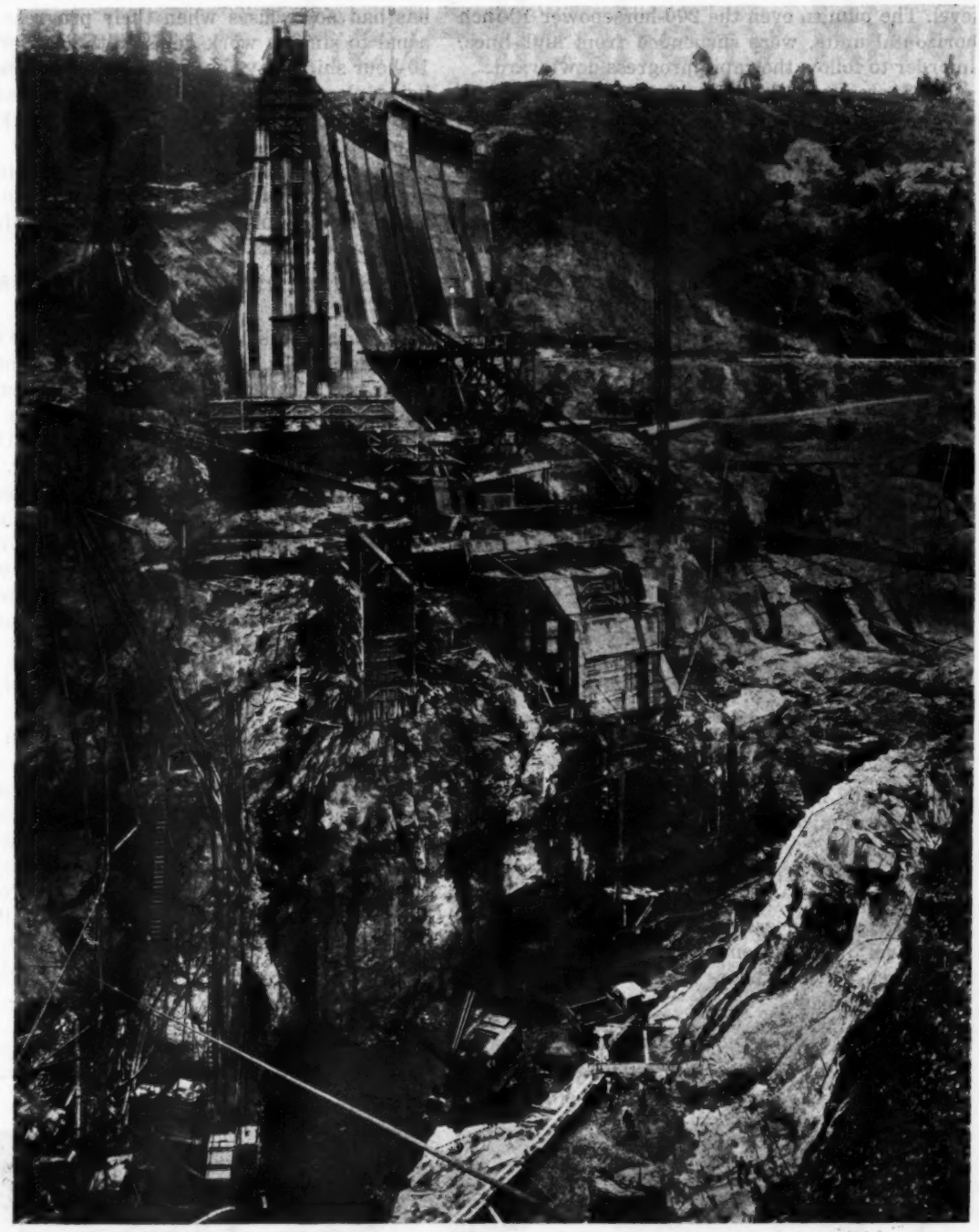
A battery of 16 pumps was assembled and, on June 25th the excavation of the river section begun. A good start had been made, however, by underwater clamming, with two 100-foot boom Clyde derricks and 2-cubic yard Williams clamshells. This equipment had clammed over 16,000 yards of gravel to form the initial sump for the 8-inch vertical sinker pumps.

Excavating handled by five Bucyrus-Eries

Soon, the entire excavating equipment was concentrated in the "glory hole." Two Bucyrus-Erie DA-2 Diesel-powered shovels and one Bucyrus-Erie D-2 dragline of 1¼-cubic yard capacity were cutting upstream through the power house site into the deeper dam foundation. The two ⅝-cubic yard air-operated Bucyrus-Erie tunnel shovels were also lowered to the rock benches for cleanup to skips handled by two derricks. The benching of the opposite cliffs some 80 feet downstream and apart from the dam later gave support for two additional 100-foot boom Clyde derricks.

Dirt Hauling with Linn tractors and White trucks

The bulk of the material in the river section, which finally totalled 157,000 cubic yards of gravel and 42,000 cubic yards of solid rock, was handled directly from the four shovels and the dragline into dump trucks. The excavation through the tailrace and power house was sloped to create a truck ramp to elevation –55, or 115 feet below the exit road across the lower cofferdam to the dumps. The excavation was carried from cliff to cliff to allow for three straight ramp levels which were excavated successively.



With 24 feet more to go the Bucyrus-Erie 1¼-yard shovel loading to the Linn tractor is working 50 feet below sea level. 290 feet above them the crest of the dam nears completion. The masts of the Clyde derricks are 115 feet high. Note the rest of pumps at the left.

The "four horsemen" of the hauling equipment were four Linn tractor trucks. These moved out five-yard loads of wet sand on the 35% grade. Occasionally, with the load overbalanced backward by a large piece of boulder, a Linn's front wheels would scarcely touch the edges of the ruts as it roared up the incline. With them was a fleet of 16 three-yard White trucks.

Only the final cleanup in the deepest pot hole uncovered to elevation –73.7 was handled by skips. Here the rock narrowed so that it was impossible to use the dragline in the forest of pumps and suction hose. Approximately 10,000 gallons per minute inflow through the gravel strata were pumped continuously. The dragline maintained two sumps, one at each end of the dam excavation

level. The pumps, even the 200-horsepower 10-inch horizontal units, were suspended from high-lines, in order to follow the rapid progress downward.

On September 12th, one of the round boulders was sealed into its nest, the deepest pot hole, with the scant ceremony of placing concrete from a 2-yard bottom dumping bucket, and the race upwards with concrete was begun.

Sixty per cent of the gravel removed from the excavation was stock-piled for use as concrete aggregate. The river widens just below the downstream cofferdam and forms a gravel bar of suffi-

The crib construction and the driving of 48-foot steel piling was handled nicely by this D-2 Diesel dragline converted into a crane.

cient size to furnish the 400,000 cubic yards of aggregate required for the concrete structures. The gravel salvaged from the dam excavation of equal grading saved excavation in this bar below 35 feet. Two 2-cubic yard Sauerman slack line excavators powered by 150-horsepower electric hoists handle the gravel directly from the river bed to the stock bins; then belt conveyors take it to the screening and mixing plants.

Brilliant lighting aids night shift

The floodlighting of both the excavation and the concrete work is very extensive, and the night shift has had no excuses when their progress was not equal to similar work done by the day crew. Two 10-hour shifts have been used, the intervening time being planned to good advantage for blasting, repairs of equipment, servicing, form work and the like.

The concrete layout deserves mention in averaging over 1,800 cubic yards for 20 hours with a plant originally designed for an average production of 1,200 cubic yards.

Sterling trucks with special tanks haul bulk cement

Bulk cement is used and hauled by four six-wheel Sterling trucks, fitted with special tanks. Each truck has a capacity of 57 barrels of cement and maintains scheduled round trips of the 25 miles from the Woodland yard to the job in 1½ hours, including time for loading and dumping.

During the rains and blizzards of last winter while the excavation of the abutments and spillway sections was in progress, the Linns did excellent service in the mud and slime into which the very rocks seemed to disintegrate. The total excavation, including the river section, amounts to 415,000 cubic yards.

Bucyrus-Erie tunnel shovels hole through tunnels in 104 days

The diversion tunnel was driven from two portals. The bench and heading method was used with a high bench. The maximum advance was 35 feet in 24 hours and holing through was accomplished on March 27th, just 104 days from the facing off of the intake portal. Vulcan powder, Bucyrus-Erie ⅝-cubic yard air-operated tunnel shovels, Whitcomb gasoline locomotives and Ingersoll-Rand compressors and drills shared the work with the men. The rock bore totalled 48,000 cubic yards and the open-cut channels added 55,000 cubic yards of earth.

The tunnel is designed as an inverted siphon, the roof being five feet below the low-water stage

(Continued on Page 77)

Trucks were used exclusively for hauling. Linns as shown on the left distinguished themselves as the "four horsemen" of the hauling fleet during the rains and blizzards of the winter season and for climbing grades as steep as 35 per cent. In the center is illustrated one of the chain-drive Sterlings used by sub-contractor Southworth for hauling bulk cement. The special bodies built by the Earl E. Staley Company were designed by Austin Trombly, Portland branch manager of the Staley Company, with Mr. Lincoln of the Phoenix Utilities Company. They are dumped by St. Paul hydraulic hoists and are water-tight. After dumping, any cement sticking in the bodies is removed by compressed air. At the right we see one of the fleet of 16 Whites used on the excavation operations.

Spanning the Allegheny River

Buffalo Contractor Builds 500-foot Bridge on New York State Highway Project.

One of the approaches to the new Allegheny bridge. The Knickenberg organization put 43,000 cubic yards into the approaches in 36 working days.

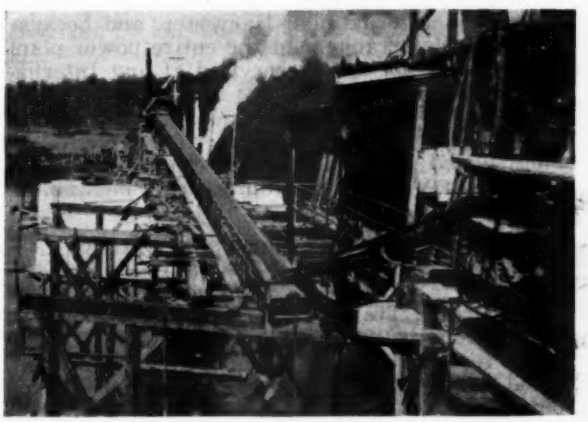
ON July 1, 1930, Peter J. Knickenberg of Buffalo began the construction of a State Highway project, the East Randolph-Salamanca Part 2-A, C. H., 1854 Bridge and Highway at Red House, N. Y. This structure spans the Allegheny River and is a truss type (pony) consisting of four 125-foot spans, resting upon two abutments and three river piers.

The work was in charge of General Superintendent Herbert Murphy, who divided his time between this project and their McKinley Parkway paving job at Buffalo.

43,000 cubic yards in two fills completed in 36 working days

The substructure called for 2,150 yards of concrete and superstructure 834,000 pounds of structural steel. The approaches on both banks of the river called for 43,000 cubic yards of embankment. The job also entailed the driving of 411 piles totaling 12,000 lineal feet. The river piers were all cofferdam construction enclosed with Lackawanna sheet piling, 20 feet in length.

In carrying out this project the fills were first completed, a Bucyrus-Erie GA-2 being used for this work. The 43,000 cubic yards for the embankments was hauled from a gravel pit one-half mile distance, where Wally Mauer operated the 1-yard Gas + Air. The entire fill was completed in 36 working days.



The Barber-Greene belt conveyor took the concrete from the Foote 21-E paver and emptied it directly into the forms.

Shovel-clamshell pile driver proves handy outfit

The next step was the excavation of the east abutment, which was dug with a Bucyrus-Erie 1035 shovel operated by Adelbert Kring. The 1035 was then converted into a clamshell to dig below water level. Later on, this machine was changed again and used as a piledriver for the driving of necessary piling on this abutment. The structure was then poured from the embankment, upon which a Foote 21-E Paver had been placed. Material was "dry batched" in one-batch trucks from an Erie Weighing Aggremeter located at Red House Station on the Pennsylvania Railroad about one-quarter of a mile distant. The Aggremeter was charged by a Bucyrus-Erie Type 1035 gasoline clamshell.

Here are some of the men responsible for the excellent progress made. Superintendent Murphy is standing second from the right.

Foote Paver hooked with Barber-Greene Conveyor makes very efficient layout

The East Pier was poured next. A Barber-Greene belt conveyor, mounted on false work, also designed to carry the steel superstructure, received

(Continued on Page 99)

EQUIPMENT YOU OUGHT TO KNOW ABOUT

I-R Compressor for Outdoor Service

A NEW 2-stage, air-cooled, electric-motor-driven air compressor that can be used in outdoor or exposed locations throughout the year without danger of freezing is a recent addition to the Ingersoll-Rand line. The outfit is made in two styles; a direct-connected unit for installations that are fairly permanent, and a V-belt-driven unit for contractors and others who desire a semi-portable machine.

This compressor, Type "TLC," is particularly applicable to structural steel work and general contracting service, since it requires no water connections. The compressor and its driving motor are mounted on a single subbase, making a compact, self-contained unit that may readily be moved. A lifting bale can be attached to facilitate moving from floor to floor, or for handling on and off a truck.

The "TLC" has a piston displacement of 155 cubic feet per minute and is designed for 100 pounds discharge pressure. It is delivered ready for use as soon as lubricating oil is supplied and power connections are made. Lubrication is automatic. Control is automatic and the machine operates only when air is being used. Ball bearings are used on both motor and compressor and require no adjustment. An airsealed unloader protects the motor by unloading both cylinders and intercooler whenever the compressor stops.

Additional information may be obtained by writing *Ingersoll-Rand Company, 11 Broadway, New York City.*

Mack Announces New Six-Cylinder Truck

A LATE addition to the Mack line, offered with either a covered or coup-type cab, is the new Model AK Six. Designed for heavy-duty service where greater speed and power are essential, the AK Six meets a specific need and does not supplant the present Mack four-cylinder AK.

Powered by a Mack six-cylinder engine, with bore and stroke of 4½ inches by 5½ inches, it develops 126 horsepower at 2,200 r. p. m. Smooth running at all speeds is assured by the use of a crankshaft which has integral counterweights and a vibration damper. Transmission has four speeds forward and one reverse.

Final drive is by either chain or enclosed gears. The latter are of the Mack dual-reduction type. A 45-degree tilt to the banjo-type axle augments its strength and road clearance. The chain drive used is of the familiar type used on Mack Bulldog for many years. Four-wheel brakes are of the expanding type, the foot brakes being vacuum booster actuated, and the hand lever operating a secondary set on the drive-shaft. Long springs are mounted in rubber shock insulators and insure driving comfort, riding ease and maximum protection. Standard wheelbase lengths of 174, 186 and 197 inches are available.

For complete information see your Mack dealer or write *Mack Trucks, Inc., 252 West 64th Street, New York City,* referring to *The Excavating Engineer.*

Bates Tractors and Stockland Graders Viewed at Show

FOOTE Bros. Gear and Machine Company had on display at the Road Show a representative line of Bates Tractors and Stockland Graders in various sizes and with auxiliary equipment. Graders shown were 80-12 straight wheel, 35-8 leaning wheel and No. 2 Whippet.

In the tractor line, the display consisted of a Model 80 equipped with snow remover, a standard Model 45 and the Model 35 tractor, equipped with new Bates Bulldozer.

Information concerning any of the Bates Tractors or Stockland Graders may be had by writing *Foote Bros. Gear & Machine Co., 111 N. Canal St., Chicago, Illinois.*

New Eight and Ten-Ton Locomotives

A NEW series of Brookville Locomotives, exhibited for the first time at the Road Show, was announced by *Brookville Locomotive Company, Brookville, Pennsylvania.* Designed for McCormick-Deering power, these new locomotives are of eight and ten-ton sizes. Speed range is two to 16 miles per hour. The engines are installed in chassis without alterations, together with clutch, also manufactured by International Harvester, and because of this simple arrangement the entire power plant and transmission can be serviced at any International Harvester branch.

Both the 8-ton (illustrated) and 10-ton models have five forward and five reverse speeds, gears being shifted while load is in motion. For further information write the manufacturer, mentioning this magazine, please.

Williams Exhibits Buckets and Trailer

THE Road Show exhibit of *G. H. Williams Company, Erie, Pennsylvania,* included the Williams "Arch-Girder" Trailer with such improvements as great strength without added weight, "shock-proof" rear end, lower loading point at rear, reinforced "arch-girder" front end, oversize Timken bearings, etc.; the Williams "Champion" Bucket improved to add to the digging efficiency; and the Williams "Double-Arch" dragline bucket.

G. H. Williams Company reports 1930 sales as "ahead of any previous year" and the interest shown toward their exhibit further bears out Williams' popularity.

New Bottom Dump 11-14 Yard Trailer Shown by Athey

THE hopper-type rear dump trailer recently added to the Athey Truss Wheel Company line of standard dirt-moving equipment proved to be of interest at the Road Show.

This new large-capacity unit not only offers the contractor the advantages of a single unit of large capacity, but owing to its design and method of operation, has proved capable of reducing the actual hauling costs, and effecting worthwhile savings in the handling of material throughout the entire job. This 11-14 cubic yard hopper type rear dump trailer (shown here) is especially adapted for operation on those jobs where specifications require filled material to be laid down in layers, as a simple adjustment is provided on the gate to vary the depth of the layer of material from 6 inches to 18 inches. Hopper type trailers are designed for power shovel loading and the large door permits dumping of any stone or rock that can be handled by the dipper. Dumping is controlled by tractor operator and door closes automatically.

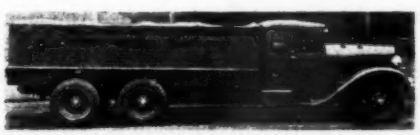
Other Athey Truss Wheel equipment exhibited includes the improved 3-Way Dump of 7-8 yard capacity and a 5-6 yard Athey 3-Way Dump Trailer arranged for operation with elevating graders.

For further information on any products of the Athey line, write to *Athey Truss Wheel Co., 130 N. Wells St., Chicago, Illinois.* Please mention *The Excavating Engineer.*

New Relay 275-H.P. Truck

A NEW truck, just announced by the *Relay Motors Corporation of Lima, Ohio,* is a dual-engine, six-wheel, heavy-duty model. So powerful is the new model that double loads in excavation or building construction jobs, a capacity of four to six yards of wet mixed concrete, or 5,000 to 10,000 bricks or tile, in a single load are possible.

Driven by two huge engines, the new model, according to its designers, is the most powerful truck ever built. It will carry bigger loads than have ever been possible before in truck transportation with greater protection to the highway over which it travels. It is also claimed to be the fastest heavy-duty truck in existence.



The new truck is equipped with two straight-eight cylinder truck-type engines with a combined power of 275 brake-horsepower at 2,800 r. p. m. The power is applied to the drive in a radically new way, never attempted before. Each engine delivers power to a separate Relay rear axle. The engines may be used in combination, or one at a time. Each engine has its own transmission. An air mechanism shifts the twin transmissions in perfectly synchronized time.

Safety and quick-stopping facilities have been provided by its builders. The new model is equipped with heavy-duty air brakes, with cast brake drums and moulded brake blocks on all six wheels, and air connections for trailers. Twin emergency brakes offer an added margin of safety in stopping. A hydraulic booster mechanism on the steering apparatus eliminates all steering strain and reduces the driver's fatigue to the absolute minimum.

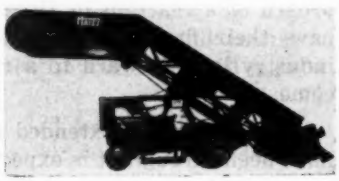
The reduction in operating cost offered by the dual engine feature is a development that will appeal to heavy-duty truck operators, it is pointed out. The opportunity for saving on gasoline and oil consumption by cutting off one of the engines when the truck is running empty or with a small load is a considerable factor of economy.

Complete information may be obtained from the manufacturers on request. Please mention *The Excavating Engineer.*

Haiss Announces New Model Snow Loader

A RECENT announcement, the Haiss Wheel Snow Loader Model 31, shown below, has been designed so that it could be moved quickly from one place to another — traction speed, 8¾ miles per hour.

It has a loading capacity of 7½ yards per minute. The power chassis is a Case Tractor mounted on heavy rubber-tired wheels. The motor is 4-cylinder, bore 3⅞ by 5½ inches. The Haiss take-off box is inserted between the rear end of the tractor and the engine to drive the elevator at a speed of 160 feet per minute. The crowding speed of 35 feet per minute is accomplished by means of the Haiss worm which can be engaged or disengaged at will. The operator can raise and lower the elevator by means of the hand wheel shown in the photograph. He can either stand or sit on the operator's platform and steer the machine from that position. For further information please write *Geo. Haiss Mfg. Co., Inc., 141st on Park Ave., New York, N. Y.*



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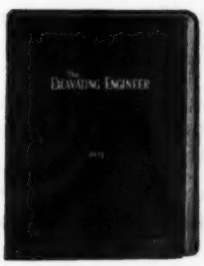

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THE EXCAVATING ENGINEER PUBLISHING CO.
F. O. Wyse, Manager-Editor—Arnold Andrews, Associate Editor
E. M. Heuston, Advertising Manager.
South Milwaukee, Wisconsin
Printed in U. S. A.

1931 to Be a Year of Competition

FORECASTS of business conditions are becoming less definite than they have been during the past few months. It is just as hard to determine the exact point of time when the curve of business activity will start slowly upward as it was to predict just when it would start downward after the long, steady rise it had enjoyed up to the summer of 1929. But just as the more careful students of business were predicting the approach of a reaction in 1929, so today, those who have their fingers most closely on the pulse of industry look forward to a rise in the months to come.

Today after the extended major depression we have been through, it is expected that the improvement will be gradual rather than rapid. And that brings us to the title of this editorial.

This period of gradual increasing business will also be one of intense competition. The past year has shown many a man that he can no longer look for easy money. That from now on, he must buckle down and prepare to fight for each bit of profit. And the man who makes the greatest success within the coming few years of increasing business activity will be the man who realizes now that to meet the keen competition he must use the best tools available—modern, up-to-date equipment in the finest condition possible; well-trained, carefully organized men; modern ideas concerning the employment of capital to increase profits. The man who attempts to meet coming competition with antiquated and old-fashioned methods will have a harder time during the coming months than he has had during the past year.

It seems almost unnecessary to review those conditions that are favorable to an increase of business activity, but since we had so much pessimism thrust upon us during 1929, it is probably desirable do to so. There are two distinctive classes of individuals that are looking forward to better times. One very large class, that has said good-bye to the year of 1930 with a sigh of relief and an air that means "I am glad you've gone; your successor will be a lot better." The other class is a much smaller one and is composed of those who have carefully studied conditions for many years and find today's conditions fundamentally constructive and the most unfavorable feature, that of psychology.

Let us look for a moment on what these careful students have to say. In the first place there are ample funds available for the use of business. In the second place the extremely small production during the past year has reduced the stocks of manufactured products to a point where any increase in demand will be felt not only by the retailer, but will be reflected promptly back to the manufacturer. The third favorable feature is an important change in sentiment. The average man is beginning to feel that the worst is over and on the first concrete evidences of improvement is likely to resume, in some measure, his former habits of buying. But there is a danger here: within the next few months industry's earning statements for the last half of 1930 will be made public and it is probable that, in many cases, these will show marked reductions over the preceding statements. We should be prepared for this and remember that these earning statements are history, not a reflection of present activity or present prospects. It is the present belief that the stock market has already discounted this bad news and in most cases it will probably be found that there will be no great weakening in the security market as these earning announcements are made.

The National City Bank of New York points out in their business letter for January another interesting point.

"One further important fact worth bearing in mind in connection with the outlook for 1931 is that 1930 has been a year of debt paying, when a large part of the current income of the people has been absorbed in liquidating all sorts of obligations incurred during the period of free spending. Of stock exchange credit alone the American people have paid off upwards of $6,500,000,000 since the 1929 peak, to say nothing of the liquidation of instalment credit and other forms of indebtedness. As soon as this liquidation is completed it means the release of an enormous amount of funds for current purchasing. And not only that, it means also that people, having paid off their old debts, are once more in a position to contract new ones and to start all over again the process of supplementing current funds by anticipating future income. This is always the way in which the clean-up after a period of excess lays the foundation for a new period of expansion."

Ariel Hydro-Electric Development Nearing Completion

(Continued from Page 72)

and 28 feet below the cofferdam at the intake. This diversion will be necessary throughout the winter of 1930-31, as well.

The maximum flood of recent record was in 1927 of over 60,000 cubic feet per second. Such a flood would, of course, overtop the cofferdam, so provision is made for a temporary spillway through a low section of the concrete dam and to one side of the power house.

The complete control of the North Fork of the Lewis River by the five dams contemplated is quite comparable in potential horsepower with that of

Tunneling in rock is this fellow's job. After completing the 1,462-foot by-pass tunnel, two of these air-operated ¾-yard Bucyrus-Eries were used for clean-up on the rock benches.

the Boulder Dam development. The initial unit of the four proposed for the Ariel site will be installed early next spring. It is to be of 57,000 horsepower.

When the diversion tunnel is closed next May and with the concrete dam to elevation 240, or 313 feet above the lowly pot hole, a reservoir 12 miles long and 1⅛ miles at the widest, will begin to fill. The reservoir capacity is 220,000 acre feet.

Tunnel closed by unusual method

An ingenious method will be used to close the tunnel with a concrete plug. A 12-inch well hole has been driven 125 feet down to the roof of the tunnel into the center of the rock keyway cut for the plug and concrete will be shot through this hole after the tunnel is pumped out and forms for the plug built. The heavy gates at the intake and outlet portals need only to be utilized for the initial closure of the tunnel while placing forms and concrete in the permanent plug.

The camp site is ideally located overlooking the hillside, downstream from the construction plants. A feature which has actually paid in the accommodation of the contractor's executives and in advertising value to the operating company, was the construction of the eight permanent houses for the operators of the power project at the beginning of the work instead of the end, as is usual. The residences are of Old English architecture, which, with entire landscaping and lawns now complete, lends dignity to the impression carried away by the casual visitor. The houses are occupied temporarily by the construction company's officials.

The Ariel Development is being constructed by the Phoenix Utility Company for the Inland Power and Light Company. The plant will be operated by the Northwestern Electric Company of Portland, Oregon. These three companies are subsidiaries of the Electric Bond and Share Company.

The entire project is in charge of H. F. Lincoln, Construction Manager of the Phoenix Utility Company, with R. C. Booth, Assistant Construction Manager, and R. W. Spencer, Resident Engineer. The Northwestern Electric Company's operation is under L. T. Merwin, Vice President and General Manager. Mr. Merwin is also Vice President of the Phoenix Utility Company.

Features of the project

The initial development of the project will, by about June, 1931, present the following features:

1. A reservoir, 12 miles long by 1⅛ miles wide, cleared of virgin and second growth timber, to impound 220,000 acre feet.
2. The dam, 1,375 feet long across the crest, containing 308,000 cubic yards of concrete. The major part of the dam, consisting of variable radius arch construction, 313 feet high from bed rock. The spillway section with five tainter gates of 30-foot lift, four of which are 39 feet wide and one 10 feet wide, capable of discharging an extreme flood of 100,000 second feet.
3. A power house directly downstream from the dam and spanning the canyon, with provision for four units of 62,000 horsepower each. The generator housings will be of the outdoor type, a gantry crane of 350-ton capacity spanning the units.
4. A separate 110-KV switchyard and a 110-KV transmission line to serve the Portland area.

So you had a date with a shovel runner?
No, I tore my dress on a nail.

"I'll work no more for that man, Sullivan," declared Casey.

"An' why?" inquired his friend.

"Sure an' 'tis on account of a remark he made."

"An' phwat was that?"

"Casey," says he, "you're fired!"

Excavation for 1931 Highway Construction

SUPPLEMENTING the very complete forecast for highway construction which appeared in *January*, we give below further information received too late for publication at that time.

Colorado

The total Colorado Highway Fund for 1931, including recent Federal Aid Emergency Allotment, is about $9,700,000. Of this, in the neighborhood of seven and one-half million will be used for construction and the remainder applied to maintenance, administration, surveys, traffic signs and census, property and equipment, and miscellaneous small items. The budget for the year has not yet been completed and made public by Governor Adams, so the exact location of the funds cannot be accurately determined, and the following forecast is tentative and expresses only the attitude of the administrative department as to what will probably be the allocation. It is very likely that about one and one-half million dollars will be expended on Roads 40 and 40 North, including the completion of the Denver-Limon road and improvements between Berthoud Pass westward to the State line. It is anticipated that an extensive project may be made in Moffat County, involving the use of 100% Federal Aid funds under the Public Domain Oddie-Colton Bill.

On Route 40 South, extending from Cheyenne Wells to Limon, Colorado Springs over Trout Creek Pass up to Leadville and over Tennessee Pass through Glenwood Springs to Grand Junction, probably about the same amount will be expended. It is anticipated that improvements will be made both east and west of Limon, east and west of Colorado Springs, and in the Eagle River Valley, while work will also be continued on the present project between De-Beque and Palisades.

On U. S. Highway 50 it is very likely that something over a million dollars will be expended, probably about equally divided between east of the Continental Divide and west of the Divide.

From Walsenburg westward to the State line over U. S. No. 450, there will probably be half a dozen projects aggregating between five and six hundred thousand dollars, including continuation of the work on Wolf Creek Pass and closing many gaps in the present construction.

Extensive improvements were made during the past year on the main north and south road, U. S. Highway No. 85, which make it reasonable to call for a somewhat lower appropriation during the coming year than previously. It is anticipated, however, that work on this road will require in the neighborhood of half a million dollars.

In the northeast section of the State, nearly a million dollars will probably be expended, including the completion of the 23-mile paving gap between Greeley and Fort Morgan and an underpass at Brush.

State projects not receiving Federal Aid will require something over $600,000. The most important work will be the completion of Loveland Pass and the continuation of improvements east of Fort Collins. In addition to this there will be about 15 projects of over $10,000, and probably 80 projects under $10,000.

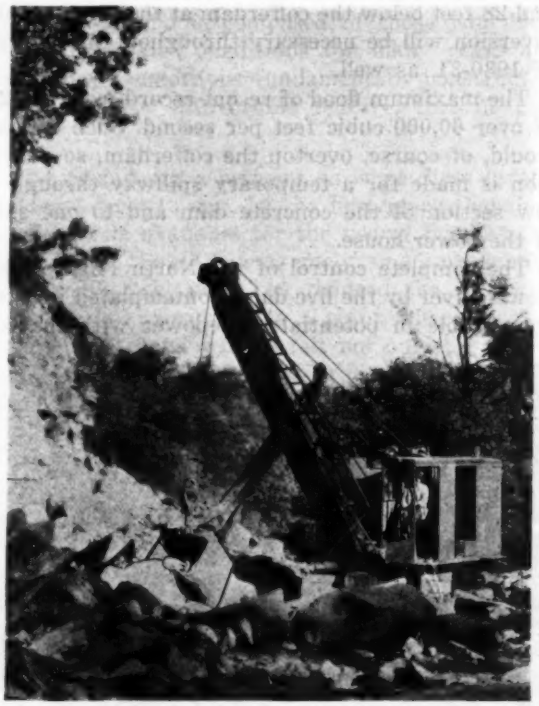
In addition to the above activities carried on with funds under control of the Highway Department, it should be noted that two projects, aggregating about $1,000,000, are under way in Rocky Mountain National Park. These projects are being executed under the supervision of the Bureau of Public Roads from funds allocated by the National Forest Park Service. The Bureau also has under its supervision eight or ten Forest Highway projects aggregating something over $600,000; the most important being Berthoud Pass, Willow Creek Pass, Rabbit Ears Pass, Six-Mile Creek running from Deckers to Buffalo, and several others.

Florida

During the year 1930 the State Road Department of Florida maintained 3,700 miles of roads of all types and has paved 299 miles and graded, preparatory to paving, 150 miles. The total cost of maintenance and betterment has been $1,751,000, and of construction, $9,249,000.

During the year contracts were let for 324 miles of paving, 6.96 miles of grading and 6,769 feet of bridges of which amount 3,988 feet were concrete. The contract cost of bridges amounted to $813,204.92, and the paved roads $6,175,980.15, and graded roads $94,262.26.

The budget for 1931 is not yet adopted, but it is expected that receipts will be between ten and twelve million dollars in 1931, which amount will be spent on construction and maintenance.



The heavy digging of this mountain stretch of Seneca Trail on West Virginia Route Number 5 is handled by the Gilbert Construction Company with Bucyrus-Erie 1¼-yard Gas+Air shovels and Indiana trucks. This job will be fully described in an early issue of The Excavating Engineer.

Georgia

Through the courtesy of Contact Engineer M. E. Cox, we present below a tentative program representative of the present plans of the State Highway Bureau of Georgia. The program is flexible and it is quite possible that more grading will be done than is indicated. The plans for 1931 represent an increase in expenditure for road work of 40% over the work performed in 1930. Present plans call for grading of 200 miles of new road, of which approximately 150 miles, costing $1,500,000, will be Federal Aid highway, with 60 miles, costing $700,000, State highways. In addition, about 40 miles of Federal Aid highway will be reconstructed at a cost of $200,000 and about 10 miles of State road will be rebuilt at a cost of $40,000. The grading on new roads averages about 9,000 per mile and about 70% of it is suitable for shovel excavation. In addition to the work outlined, about 275,000 cubic yards of grading will be carried over into 1931 on old contracts. It is expected that Georgia will pave approximately 550 miles of highway during 1931 at a cost of about $10,000,000.

Idaho

A wire report from R. H. Shoemaker of the Idaho Bureau of Highways informs us that the total mileage of new state highways completed in Idaho during 1930 amounts to 37 miles of grading, 106 miles of crushed gravel or rock, 405 miles of oiled and 54 miles of concrete pavements. It is estimated that the expenditure to cover these items will total $5,200,000. For 1931, the estimated expenditure for maintenance and reconstruction is $1,900,000, and for construction and betterments, including emergency Federal appropriation, $4,900,000.

Illinois

The present Illinois highway program includes the grading of 271.84 miles of new road, which is expected to cost approximately $3,290,981. The bulk of this will be on Federal Aid roads, but 11.2 miles, costing $100,000, will be State roads. A forecast of the county and local road work is not available at this time, nor is it possible to give figures on the amount of reconstruction, widening, etc. The new road work mentioned above will involve about 4,621,280 cubic yards of excavation. In addition to this, Illinois will carry over about 750,000 cubic yards of excavation on old contracts involving a total expenditure of approximately $300,000. Illinois expects to pave 536 miles of road during 1931 at a cost of $16,299,000, and in addition will widen 39 miles of paving at a cost of about $1,737,000. In addition, about 177 miles of paving on old 1930 contracts was uncompleted as of December 1, 1930.

The total 1931 road program as it stands on January 1st represents an increase of approximately 10% over the 1930 program.

Louisiana

A Western Union report from H. B. Henderlite, State Highway Engineer of the Louisiana Highway Commission, informs us that Louisiana's 1930 program consisted of 503 miles of concrete pavement, 1,242 miles of gravel surfacing and 7.76 miles of combination steel and creosoted timber bridges. The cost of the total 1930 program was approximately $26,000,000. The 1931 program will probably consist of 1,200 miles of concrete pavement, 500 miles of asphalt pavement and 1,500 miles of gravel surfacing, 10 major movable span and five major fixed span combination steel and concrete bridges, ranging in cost from $200,000 to $1,500,000, and a one-third participation in a bridge over the Mississippi River at New Orleans to cost approximately $21,000,000. It is estimated that the program started in 1931 will total approximately $60,000,000, and about two-thirds of the work represented will be completed during the year. The length of the average paving project in Louisiana is over 10 miles, the concrete paving being 868-section unreinforced. The cement is purchased by the State. Grading on the paving projects is medium-heavy. All large structures are let under separate contracts. All construction work on Louisiana highways is performed under standard highway contracts awarded to the lowest responsible bidder with no political interference with award or operation of contracts. All design and plans for highways and bridges are prepared and all construction is supervised by engineers of the Louisiana Highway Commission.

Michigan

A telegraphic report from G. C. Dillman of the Highway Commission informs us that during 1930 Michigan laid 702 miles of various types of surfacing at an estimated expenditure of $25,000,000. It is expected that expenditures for construction during 1931, including the emergency Federal Aid apportionment, will total $25,500,000.

New Mexico

During 1930 New Mexico spent $9,093,299 for highway construction and maintenance. Federal Aid work consisted of oil-processing 67.2 miles, graveling 224.6 miles, and grading and draining 1.8 miles. Total expenditure on this Federal Aid construction, including bridges, amounted to $2,679,805. State Aid construction, betterments and reconstruction on approximately 750 miles cost $1,416,295, and oil-processing 247 miles cost $1,232,000. Maintenance cost $1,578,985.

An approved estimated highway program for 1931 for New Mexico is not yet available. The final program hinges on such action pertaining to highways and highway finance as may be taken by the State Legislature, which meets in January, and the formulation of an augmented Federal Aid program based on the recent emergency appropriation made by Congress.

Based on a "pay-as-you-go" plan, which includes only such revenues for highway purposes as are now definitely provided, anticipated receipts for 1931 are $6,000,000, derived as follows: gasoline taxes, $2,000,000; motor vehicle fees, $500,000; common carrier fees, $50,000; Federal Aid (round numbers), $2,000,000; and Federal Aid (hold-over funds), $450,000.

The above does not include the contemplated advance by the Federal Government to match Federal Aid as provided by the recent emergency act. This amount, in round numbers, for New Mexico is $1,300,000.

Using only the $6,000,000 available, New Mexico's tentative highway program for 1931 would be approximately as follows: Federal Aid (new), 160 miles, $2,700,000; maintenance, 5,500 miles, $1,500,000; State Aid, construction, $100,000; administration and administrative engineering charges, $350,000; equipment, shops and stores, $300,000; surveys, $50,000; emergency, $100,000, and principal and interest on bond and debentures, $900,000.

The advance of $1,300,000 to New Mexico by the Federal Government to match Federal Aid will augment the State's Federal Aid program (over that tabulated above) by approximately $1,050,000; leaving $250,000, which may be used for over-runs and contingencies or a small oil-processing and State Aid program.

In addition to the road work which has been forecasted in these pages, many millions of dollars will be spent during 1931 on other public works projects such as the drainage work illustrated above. The work shown is in Jefferson County, Kentucky, where cleaning of drainage ditches is handled by a Bucyrus-Erie 1¼-yard Diesel dragline.

New York

The 1931 highway program is at this time expected to approximate that of 1930.

Nova Scotia

The 1931 highway program for Nova Scotia has not as yet been compiled. It will, however, be completed some time in the near future, at which time an account will be published in The Excavating Engineer.

Through the courtesy of the Department of Commerce, we present a number of foreign highway forecasts furnished by the U. S. Consular Service.

Finland

In its 1931 budget, the Finnish Government proposes to grant Fmk. 41,389,000 ($1,043,003) for highway and bridge construction as against Fmk. 56,450,000 ($1,422,540) in the 1930 budget and Fmk. 43,800,000 ($1,103,760) in the 1929 budget.

(Continued on Page 100)

100 - H. P. LINNS

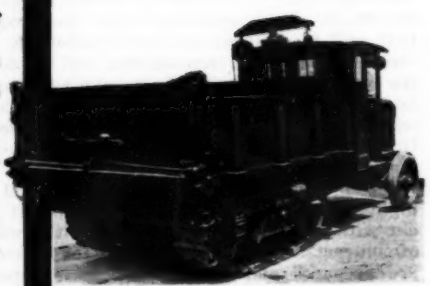
Through deep pit mud.
Above: Up steep grades.

WORKING SCHEDULE PER YEAR 290 DAYS!

"Two Linn tractors move 180 to 360 tons of anthracite coal daily . . . working schedule of about 290 full days a year . . . hauls range from 1/8 mile to 5/8 mile one way . . . ground conditions vary from jagged rock to deep mud, with grades up to 37%."

These findings are from the unbiased report of A. C. Nielsen Company investigating engineers on this job. Their facts tell how two Linn tractors kept the expensive equipment plant of the P. B. Brown Excavating Company of Hazelton, Penna., going the year around under adverse conditions. Linn equipment will give these same advantages to you. Write for Certified Performance Survey No. LT-65-RZ.

We cordially invite you to visit our booth No. A-106 at the St. Louis Road Show.



Note sturdy simplicity of Linn design. A single payload unit, operating with positive flexible traction.

LINN MANUFACTURING CORPORATION

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In writing to Linn Manufacturing Corp., Div. of La-France Republic Corp., please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE

Elect Officers of American Road Builders' Association

By A. J. KOENIG

At the final session of the American Road Builders' Association held at the Arena in St. Louis, Missouri, the following officers were elected: W. R. Smith, Meriden, Connecticut, contractor, President of the Association, succeeding W. A. Van Duzer; Otto Kent, Engineer of the Kent County, Michigan, Road Commission, was elected President of the County Highway Officials' Division; George B. Sowers, Commissioner of Engineering and Construction, City of Cleveland, Ohio, was elected head of the City Officials' Division; Samuel Eckels, Chief Engineer, Pennsylvania Highway Department, was chosen Vice-President of the Northeastern Division; Robert B. Brooks, Director of Streets and Sewers of St. Louis, was elected Director.

Ceramic Congress to Cleveland

The Ceramic Congress, under the auspices of The American Ceramic Society will be held in the Cleveland Auditorium, Cleveland, Ohio, on February 22nd to 28th. Meetings and Expositions will cover art, enamels, glass, heavy clay products, refractories, whitewares and terra cotta.

Road Widening Above Hoover Damsite Already Underway to Aid Contractors

By W. A. DAVIS

Clark County, Nevada, with the aid of State and Federal appropriations, is widening to 16 feet and surfacing with clay to hold down the sand, the road which will serve the contractors in giving access to the upper end of Black Canyon. It will no doubt later be connected up by ferry to

the proposed road which will come down the Kingman Wash until the Dam is completed, when the road will pass over the top of this mammoth structure and through the town of Boulder, enroute to Las Vegas.

One mile of this widening involves from 20,000 to 30,000 cubic yards of rock. Some of the boulders already moved weighed over 50 tons, and some as large as 200 tons remain to be shot out. Giant Powder has been used on some of the blasting. The shovel on the job is a ¾-yard Universal powered by Fordson motor. Operator Richardson is making very good yardage, considering the nature of the digging and the size of the dipper on his tractor-shovel. Mr. Graham is superintendent on the job.

National Parks Continue Work on Highways and Trails Throughout the Winter

One of the highway jobs, that of building a tunnel through solid rock, will continue all winter in Yosemite National Park, California, according to a report from the Department of the Interior.

Reconstruction of the Bright Angel Trail continues all winter in Grand Canyon National Park. This trail is one of the long-remembered features of Grand Canyon by all those who either hike or ride muleback into the depths of the Canyon. It passes along ledges and through clefts in the solid rock walls. The new trail, now being constructed, will be just as spectacular as the old one, but of sufficient width and ease of grade to afford perfect safety.

Important Western Projects to Contribute to Nation's Prosperity in 1931

Among the projects for which bonds have been voted, or plans definitely outlined in eleven Far Western States, the following nineteen, totaling $1,206,230,000, promise to contribute largely to making 1931 a year of good times. The tabulation of these as given by the *Western Construction News* is as follows:

State Highway programs in eleven Far Western States for 1931 (money available from gas tax funds and bond issues)	$ 250,000,000
Street paving for cities and counties	225,000,000
Boulder Canyon project for U. S. Bureau of Reclamation (bids to be opened during February, 1931, for Hoover Dam, Tunnels and Power House, Railroad and Highway. First unit, $70,000,000)	165,000,000
Colorado River Aqueduct for Metropolitan Water District, Los Angeles, bonds to be voted in April, 1931	200,000,000
Golden Gate Bridge across San Francisco Bay, call for bids to be issued immediately	35,000,000
Oakland-San Francisco Bay Bridge, War Department permit pending, construction to start during 1931	72,000,000
Richmond-San Rafael Bridge	12,000,000
Dam and Conduit, Pine Canyon project for City of Pasadena, bonds voted, call for bids to be issued shortly	10,000,000
Harbor Improvements for State Harbor Commission at San Francisco, bonds issued, $10,000,000; call for bids to be issued at once	10,000,000
Sewer Improvements for City of Phoenix, Arizona; call for bids to be issued at once	1,000,000
Power and Public Utility Improvements in eleven Far Western States for 1931	150,000,000
Hetch-Hetchy pipe lines, call for bids to be issued early in 1931	12,000,000
Alameda-Contra Costa County Road District, California, tunnel and highway, to be under construction in 1931	5,000,000
Niles-San Francisco Railroad for Western Pacific California Railroad, permit pending before Interstate Commerce Commission	8,000,000
Los Angeles City Water Improvements, bonds voted, work to start soon	39,000,000
El Vado Dam for Middle Rio Grande Conservancy District, Albuquerque, New Mexico; bids to be advertised in spring of 1931	1,600,000
Sanitary Sewers for City of Los Angeles	5,650,000
Dam, Reservoir, Pipe Line, etc., for City of Santa Barbara	2,480,000
Bonds to be voted on in January for Roads and Streets in San Francisco.	2,500,000
	$1,206,230,000

Shots From the Firing Line — *Continued*

Wichita to Have Southwest Road Show and School

The Sixth Annual Southwest Road Show and School will be held in Wichita, Kansas, February 24-27, under the auspices of the Wichita Thresher and Tractor Club. Reduced rail fares from points in the Central and Southwest states. If you attend, obtain your convention certificate when buying your going transportation.

New England Notes

By E. J. O'CONNOR

Herbert Wright of Worcester, Massachusetts, with the above Bucyrus-Erie Gas+Air is supplying the gravel on the Greenough Construction Company's job at Andover, Mass. Mr. Wright's Gas+Air averaged 220 5-yard truck loads of material per 9-hour day while loading out gravel borrow.

New York Notes

By J. W. FAWCETT

Several weeks ago when Monsieur P. Hermil of Schneider & Cie., Paris, France, visited in this country in connection with the placing of an order for an 8-yard dipper dredge with Bucyrus-Erie Company, your correspondent had the pleasure of showing him some of the underground and dredging work in this vicinity.

We arranged with Pat McGovern, through the courtesy of the Superintendent, Mr. Kelly, to visit the **Water Supply Tunnel for the City of Brooklyn** and visited about ten different shafts. Our first shaft was on the edge of the East River, directly across from Riker's Island, and we were told by Mr. Kelly, as we stepped onto the elevator which is used for raising and lowering cars of rock, taken out by these special Bucyrus-Erie air-tunnel machines to "hold fast" to a strap similar to the ones used in subways or street cars, and also to hold to our hats. We found the advice excellent, for we dropped 825 feet in the shaft in exactly one minute's time.

We found the special tunnel machines doing exceptionally good work, averaging better than 400 cubic yards in a ten-hour shift.

One very interesting phase of this work is in the construction of the elevator apparatus which Mr. Kelly has substituted in place of the ordinary three-drum gasoline or electric hoist. By building his elevator house two stories in height, Mr. Kelly has complied with the State Laws of New York, which allow him to operate under the same plan that an elevator operates in any building, so long as it is two stories above the ground. This further makes it possible for him to hire ordinary elevator boys to operate this equipment on a push-button control, and he tells me that his saving, on 19 shifts, is exactly $5,000 a week. This seems like a simple matter, but it certainly was of considerable interest to all of us, as no one, heretofore, has apparently thought of placing a hoisting unit in the category of an ordinary elevator shaft in any building.

After showing Monsieur Hermil underground work in

Are
YOU LOSING MONEY?

GATKE Moulded Brake and Friction Blocks are **saving their cost many times a year** in the prevention of expensive shutdowns. They provide smoother operation, more accurate and positive control, and continuously satisfactory service over a life many times greater than that of any other type of friction material.

You can secure GATKE Moulded Brake Blocks and Frictions for replacement on every type of heavy duty equipment—steam shovels, drag-lines, dredges and hoists—it is the standard and outstanding friction material in industrial service. Submit your special friction problems to the original manufacturers of moulded frictions, who have solved all clutch and brake difficulties for the largest manufacturers of industrial equipment.

GATKE products and GATKE recommendations will save you money. Write

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Chicago, Illinois

GATKE
ASBESGRAPHITE
MOULDED BRAKE AND FRICTION BLOCKS

For your convenience in writing Gatke Corporation you will find a card bound in this issue.

Only IN ATHEYS

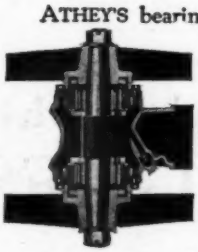
DO YOU GET THE ENGINEERING REFINEMENTS

that mean LONGER LIFE AND LOWER MAINTENANCE

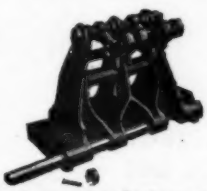
WHEN you put an ATHEY 3-Way Dump Trailer on your job, you have equipment that is as capable of giving uninterrupted service, long life with minimum maintenance, as human ingenuity can make it.

Over 75,000 ATHEY TRUSS WHEELS have seen service in all parts of the world, under every conceivable condition. They've been carefully studied—refined—tremendously strengthened—until today they offer more strength and stamina than any other equipment you can buy.

The ATHEY TRUSS WHEEL is a self-cleaning tracklaying wheel. It will operate under all soil conditions. Its simple, sturdy construction provides an extremely light-running wheel, having the greatest possible structural strength. Trip chains [replacable parts] are placed in the upper part, and track pins in the lower part to take the wear. The ATHEY track can be actually rebuilt, restoring the original arch and light-running qualities, with a reduction of 75% in track maintenance.



ATHEY'S bearing seal is 100% effective. Sand, grit, abrasive materials are positively excluded by ATHEY'S triple seal, eliminating one of the greatest and most common causes of bearing failure.



The TRUSS SHOES are of the High Truss, Short Pitch type which reduces to a minimum the various stresses and bearing pressures. This increases their natural life and gives free-running qualities. They, therefore, have a greater factor of reserve strength with minimum weight.

The heavy structural steel frame is reinforced with plate and by special truss rods which give it many times the strength of other types of equal weight.

All gates downfold. ATHEY 3-Ways haul bigger loads faster and cheaper by reducing weight through improved design—by greater strength—by perfect balance—by the light-running qualities, and by their ability to dump to the right, left or rear.

It will pay you to write for complete information.

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130 N. Wells St. Chicago, U. S. A.
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The Baldwin Locomotive Works,
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Athey
TRUSS WHEEL EQUIPMENT

In writing to Athey Truss Wheel Company please use post card bound in the center of this number.

Shots From the Firing Line — *Continued*

New York, we accompanied him to Albany where we found the **Great Lakes Dredge & Dock Company's** Bucyrus-Erie Dredge, "Crest," in a very picturesque setting as it happened to be working under the beautiful bridge which the New York Central Railroad has built across the Hudson River, at Castleton, New York.

Buffalo Notes

By R. E. SHEPHERD

The snap here was made on the operations of the **Albany Gravel Company** at Albany, New York. It shows our good friend **Reno Green** at the levers of one of the five Bucyrus-Erie Gas + Air machines on this job. There is also a Bucyrus-Erie B-3 steamer in their fleet of shovels. Mr. Green recently painted his charge a brilliant red with yellow lettering and it fairly dazzles one. Carrying his idea a step further, Mr. Green wears a neat suit of overalls prominently lettered "Albany Gravel Company — Bucyrus-Erie No. 2."

Indiana Notes

By H. C. HELT

The South Bend Sand and Gravel Corporation of 3113 Lincoln Way West, South Bend, has recently been formed to take over the operations of Geo. J. Hoffman Company, H. G. Cristman Company, Beyer Sand & Gravel Company and the Midwest Sand and Gravel Company. Officers of the new company include Geo. J. Hoffman, President; W. Howard Edwards, Vice-President; Herbert H. Hoffman, Secretary-Treasurer, and Julius B. Christman, Production Manager.

Ohio Notes

By HOWARD STEPHENSON

A 30,000-yard excavating job marked the beginning of the construction of the new New York Central grade crossing at Monroe and Bancroft streets, Toledo, Ohio. The job is in

charge of George A. Harmon, Superintendent for the **Walsh Construction Company of Davenport, Iowa.**

The excavation work was completed in less than six weeks, equipment used being a Northwest dragline with a 1-yard bucket. On this job, 2,000 yards of concrete will be poured and 250 tons of bridge steel will be used in construction.

First He: "Woman's greatest attraction is her hair."
Second He: "I say that it is her eyes."
Third He: "It is unquestionably her teeth."
Fourth He: "What's the use of us sitting here lying to each other?"

Buyers can always appreciate *better equipment* and *better values,* which explains why 1930 was—

WILLIAMS' BIGGEST YEAR!

With bucket sales ahead of 1928 and '29

YOU'LL understand the phenomenal increase in sales of the *Williams* "Champion" Bucket, when you inspect this *proven and guaranteed* fastest and most powerful digger.

Drop us a line for our new descriptive bulletin on the 1931 *Williams* "Champion" Buckets.

G. H. WILLIAMS COMPANY
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WILLIAMS
BUCKETS—TRAILERS

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WIRE ROPE

THE best recommendation for "HERCULES" (Red-Strand) Wire Rope is its service record.

—But there are good reasons why this wire rope is able to give such exceptional service, some of which are:

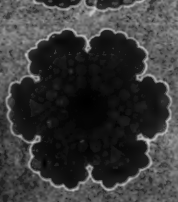
(1) It is made of acid open-hearth steel wire.

(2) Every wire put into this rope is first rigidly tested by us to make sure that it meets our exacting requirements.

(3) It is the culmination of our more than 40 years of wire rope making experience.

(4) It is made in both Round Strand and Patent Flattened Strand constructions in order to meet all working conditions.

Those who are using "HERCULES" (Red-Strand) Wire Rope find it safe, dependable and economical. Is not such service the kind that you want?



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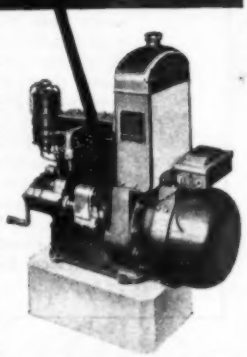
Distributors at over 100 different points. The name of our Distributor in any particular locality will be furnished gladly upon request.

● HELPING THE SHOVELS ALL NIGHT LONG



THE biggest battle on most earth-moving jobs is beating bad-weather handicaps. Toughest digging won't cause such serious upsets as continued rain and adverse weather.

Experienced contractors therefore get a jump on Old Man Weather by working double shifts.

They equip each shovel with a Kohler Plant and provide steady, constant electricity to spot-light night-digging. The night crew works as fast—the dippers swing as freely—as when the day shift operates in broad daylight. Extra yardage—the job done on time—double dividends on machinery investments! That's what Kohler Plants accomplish for the earth movers who own them.

Kohler Electric Plants do not require large storage batteries. Gasoline or natural gas serves as fuel. Current is generated at 110 or 220 volts A. C. or D. C. Capacities range from 800 watts to 10 K. W.

Built to endure, these modern electric plants serve faithfully for years. Their rugged, sturdy construction makes them stand up under constant use.

Send coupon for additional information about Kohler Plants. Kohler Co. *Founded* 1873. Kohler, Wis.—*Shipping Point,* Sheboygan, Wis.—*Branches in principal cities.* . . . Manufacturers of Kohler Plumbing Fixtures.

KOHLER OF KOHLER ELECTRIC PLANTS

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Gentlemen: Please send catalog describing Kohler Electric Plants.

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*Street*_____

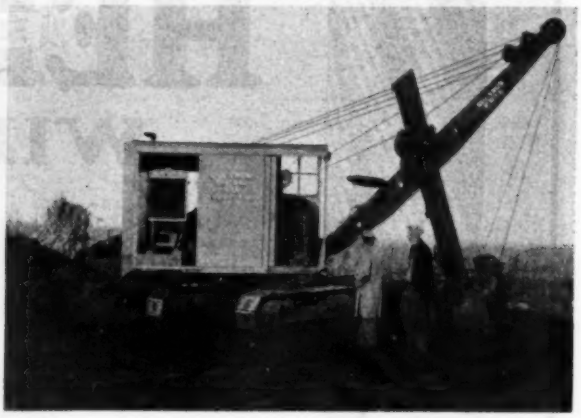
*City*_____ *State*_____

*Use in which interested*_____

Shots From the Firing Line — *Continued*

Iowa-Nebraska Notes

By A. A. FUCHS



Henry L. Lemons, Inc., of Tulsa, Oklahoma, used the above Bucyrus-Erie 1020 grading for a natural-gas line near Glenwood, Iowa. The line, being built for the Missouri Valley Pipe Line Company, extends from Oklahoma to Minneapolis. Clearing right-of-way, cutting through hills, and damming creeks, are among the duties assigned to the 1020. This ½-yard rope-crowd shovel is powered by a Waukesha gasoline motor.

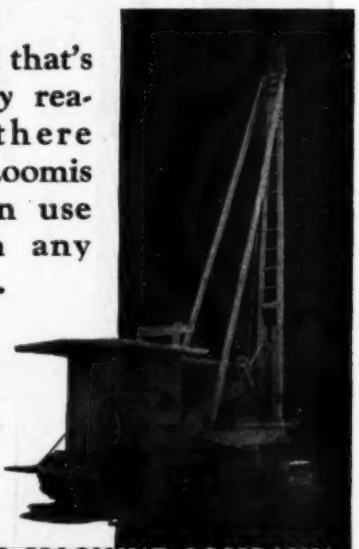
And the Fight Was On

Real Estate Agent—"Well, what do you think of our little city?"

Visitor—"Well, I'll tell you, pardner, this is the first cemetery I ever saw with lights."

Dependable?

Yes, but that's not the *only* reason why there are more "Loomis Clippers" in use today than any other make.



Write for full information.

THE LOOMIS MACHINE COMPANY

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EARN BIGGER MONEY WITH CLETRAC POWER

THE value of your tractor operated equipment, like everything else in your business, is measured by its ability to *earn money*. And that earning ability is made big or little by the efficiency or inefficiency of the tractors you use.

Cletrac Crawlers offer the kind of sure-footed, abundant power that boosts the performance of any piece of equipment and gets from it the very limit of its capacity.

Cletrac Crawlers are known the world over for their unmatched delivery of power at the draw-bar and their ability to turn out a bigger day's work every day in the year. Rolling along on sure-gripping, broad, steel tracks they make equipment get down to business regardless of the odds of weather or bad going. They handle easily and travel fast, saving time and costs on every job.

Thousands of Cletracs are used by highway departments, road and general contractors and county and municipal authorities. Cletrac's ability to handle all kinds of work speedily and economically has gained for them outstanding recognition and preference.

See the Cletrac distributor or write for complete details on any or all models.

The Cleveland Tractor Co.
19327 Euclid Ave., Cleveland, Ohio

AMERICAN STEEL & WIRE COMPANY WIRE ROPE

SO important is wire rope to industry—on excavating machines—on hoists—on elevators—and for a thousand and one purposes—that its users can afford only to specify a brand of proved dependability, economy and long life. Because of its outstanding records—and the known reliability of its maker—American Steel & Wire Company American Wire Rope will be found on most equipment where service requirements are severe.

Made by the Largest Wire Rope Manufacturer in the World

The illustration shows American Wire Rope in use on the world's largest electric shovel.

1831 1931

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SUBSIDIARY OF UNITED STATES STEEL CORPORATION

208 South La Salle Street, Chicago And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

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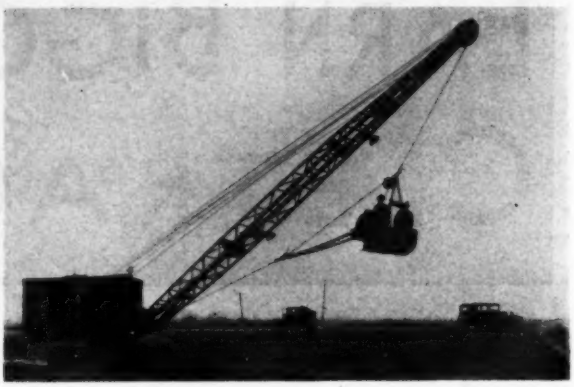
Shots From the Fireing Line — *Continued*



"Keeping the contractor out of the hole with a Bucyrus-Erie" might well be the title of the above illustration. It shows a Bucyrus-Erie E-2 Diesel dragline belonging to the **Clyde W. Drew Company**, with Contractor Clyde W. Drew and A. C. Anderson, of the Fuchs Equipment Company, in the bucket. The picture was taken near Shenandoah, Iowa, where Mr. Drew is using the E-2 on a 200,000-cubic yard State road job. Operator Herbert Huchins is at the levers. The dragline, powered with an Atlas Imperial Diesel engine, is equipped with a Kohler light plant for night work.

St. Louis Notes

By A. J. KOENIG

Missouri is opening the new year with a letting, January 24th, of 147.6 miles of highway work estimated at $3,200,000. The projects embrace 36 miles of concrete paving, 95 miles of gravel-surface construction and 16.6 miles of graded earth. This is the first letting of a series for 1931, which will total by the end of the year approximately $30,000,000.

At the last letting of the **Missouri Highway Commission**, December 19th, bids were received on the projects as follows:

Route 22, Sections 1 and 1A, 1.748 miles gravel, Aurdain and Randolph Counties, Samples & Elsea, Kirksville, Mo., $10,379. Route SB-2, 3.92 miles gravel, Cedar County, R. H. Sharp, Reeds Spring, Mo., $23,724. Route SA-2, 3.89 miles gravel, Dekalb County, Martin Wunderlich, St. Paul, Minn., $13,592. SE-1, 4.879 miles gravel, Gasconade County, T. F. Odell, Hannibal, Mo., $16,559. Route 38, Sections 16, 17 and 18, 7.422 miles gravel and crushed rock, Lawrence and Greene Counties, Neyer Const. Co., Billings, Mo., $73,124. Route Sd-3B, SM-1A and SM-2A, 9.426 miles gravel, Monroe County, W. J. Menefee Const. Co., Sedalia, Mo., $14,013. Route Ref. 2, 0.953 miles gravel, Newton County, C. I. Williams, Monett, Mo., $11,235. Routes

NOVO

FLUD-LITE LIGHTING UNITS

For lighting cranes — shovels — construction jobs — cheaply and dependably—compact—light in weight—with standard generator and Novo Roller Engine. 1¼ to 25 K. W.

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222 Porter St., Lansing, Mich.

Clarence E. Bement, *Vice-Pres. & Gen. Mgr.*

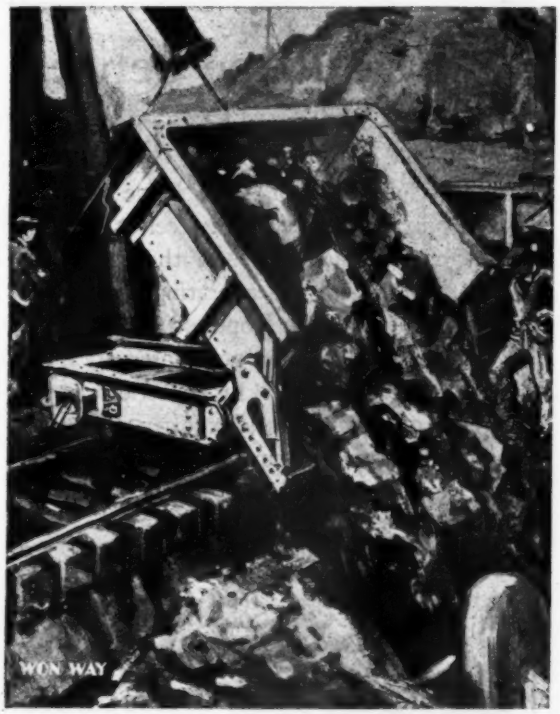
SA-1, 2, 8.893 miles gravel, Nodaway County, W. K. Ferman & Co., LaPlata, Mo., $33,146. Route SA, Sections 4, 5, 6 and 7, 14.935 miles gravel, Polk County, J. A. Kerr & Co., Ozark, Mo., $51,-221. Route 21-51, 4.96 miles gravel, Ripley County, R. E. Martin, Nashville, Tenn., $98,819. Route Ref. 1, Taney County, 2.222 miles gravel, A. E. Keith Const. Co., Kansas City, Mo., $13,026. Route 6, Sections 80 and 81, Wright County, H. H. Ruddell, Springfield, Mo., 7.29 miles gravel, $46,-438. Route SN-1, Warren County, 2.799 miles gravel, F. T. O'Dell, $20,439. Route 160, Sections 11, 12 and 14, Barton and Dade Counties, 9.889 miles chat, R. G. Aldridge, Kansas City, Kan., $116,429. Route 326, Sections D, E and F, Franklin County, 18.221 miles 30-foot concrete, A. A. Davis & Co., Inc., Oklahoma City, Okla., $208,701. Route 60, Sections 5 and 6, Newton County, 7.562 miles 30-foot concrete, Koss Const. Co., Des Moines, Iowa, $206,147. Route Ref. A and B, Mississippi County, 5.476 miles 24-foot grading, Dent Tanner, Charleston, Mo., $14,577. Route 308B, Nodaway County, 1.034 miles grading, Brosnahan Bros., Kansas City, Mo., $37,125.

The Fruin-Colnon Construction Company was awarded a contract by the Bush-Burns Realty Co. of St. Louis for grading 50 acres of subdivision property at Pernod and Hampton Aves. Three hundred thousand cubic yards of earth are involved in the project.

The Illinois State Highway Department has plans, and will soon take bids for five bridges over the Illinois waterway at Joliet. Estimated cost, $1,500,000.

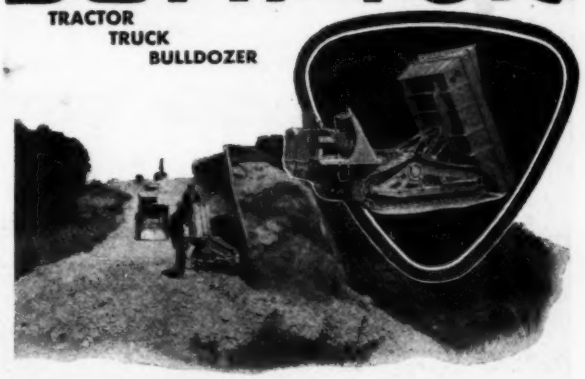
W. W. Horner, City Engineer, St. Louis, will soon take bids for the construction of curb and grading on Riverview Drive in North St. Louis, a distance of 1½ miles.

The Gasconade Bridge Company plans the construction of a 765-foot cantilever type bridge over the Gasconade River at Gasconade, Mo. The bridge to consist of a central span 276 feet, and two anchor arms 210 feet each. Sverdrup & Parcel, Consulting Engineers, Railway Exchange Building, St. Louis.



EASTON CARS
FOR EVERY PIT, MINE AND QUARRY
Easton Car and Construction Company
Easton, Penna.

KOEHRING
DUMPTOR
TRACTOR
TRUCK
BULLDOZER



Cuts Dirt-Moving Costs!

DOES things no truck does! Carries the load ahead of the driver! He sees where he dumps! He uses the body of the Dumptor itself to bulldoze. Backs away from dump before turning. It's low enough for all kinds of machine loading.

Look at the staunch, Heavy Duty steel body. How easy to spot a bucket above it without a second's delay! Broad, strong multiplanes of such low ground pressure that the Dumptor goes anywhere—where trucks can't go. Capacity 5 cubic yards.

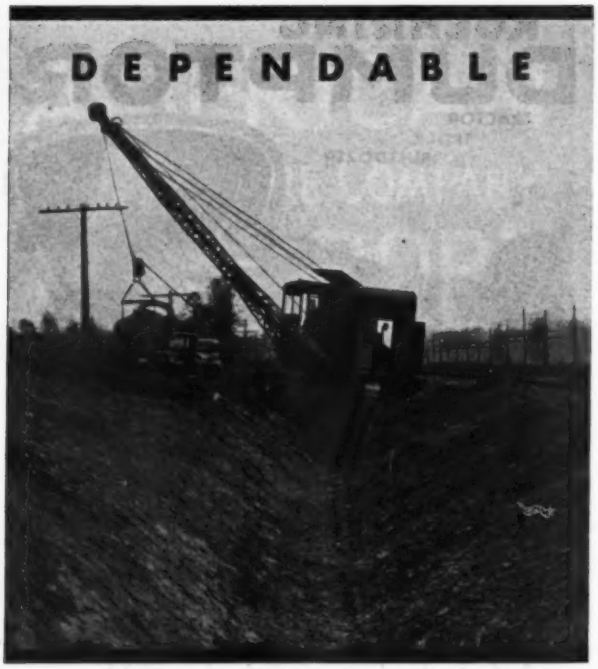
Typical Koehring Heavy Duty construction throughout. Two engines, one for each multiplane, and simple throttle steering. Three speeds forward, 1⅜, 2½ and 3¾ miles per hour.

Get the Details!

Get full understanding of how the Koehring Dumptor cuts dirt-moving costs—what mechanical simplicity means to trouble-free, long service-life! Ask your N. E. C. sales representative to demonstrate.

National Equipment Corporation Milwaukee NEC

A 6208-½



Model O *Fully* Measures Up

Hundreds of owners of Model O ⅜-yard *Utility* Cranes know from successful experience that this ruggedly built construction unit is entirely dependable and efficient.

Mechanically, it embodies the same reliable power, practical speed, operating conveniences and economical performance that have always distinguished equipment bearing the name "Buckeye".

As Clamshell, Crane, Dragline and Backfiller, this handy Buckeye—within its capacity—more than pays its way every day on some contracting job or other. It is readily convertible from one service to another.

Your investment in this or any other Buckeye is protected by nearly 35 years' specialization in producing good earth handling machinery and a definitely established policy of honest dealing.

The price and specifications of profitable Model O will interest you. May we send you a descriptive bulletin?

The Buckeye Traction Ditcher Co.
FINDLAY, OHIO

There's a Buckeye Sales and Service Office near You

for over thirty years **Buckeye**

Shots From the Firing Line — *Continued*

Keen competition was shown at the letting of the Missouri State Highway Commission on December 2nd. On the 52 projects involved in the letting, 477 bids were received. The mileage to be constructed is as follows: 13.8 miles of concrete; 32.55 miles of graded earth; 112.8 miles of gravel surfacing and 42 small bridges.

The following contractors were low bidders for some of the larger projects: Keeley Bros., East St. Louis, Illinois, .856 mile of 40-foot concrete highway in St. Louis County, $48,472; Sullivan County, 1,973 miles of gravel, involving 108,009 cubic yards of excavation, Wyland and Clark, $65,110; Gasconade County, 11.6 miles of 20-foot concrete paving, involving 135,000 cubic yards of excavation, $213,502; Lincoln County, 1,276 miles of 20 and 40-foot concrete, $40,376, to Davis Construction Company, Boonville, Missouri. Harry Tidd of Hutchinson, Kansas, was low on two projects in Scotland County, two in Mercer County, two in Knox County and one in Adair County.

C. W. Hunter Company, Memphis, Tennessee, was awarded contract for 10,000 feet of piling dikes on the Missouri River at Bonhomme Bend, at $373,475.

Massman Construction Company has contract for 8,180 feet of standard pile dikes, 1,640 feet of crib dikes, and 10,000 feet of standard revetment at Sheep Nose Bend, on the Missouri River.

His Preference

Her—"And will you love me as much as this when we are married?"

Him—"How can you doubt me? You know I've always like married women best."

No Room!

A new bank clerk was dictating his first letter, and was in doubt as to the use of a phrase, so he asked the stenographer: "Do you retire a loan?"

And the stenographer replied rather indignantly: "No, I sleep with mother."

Wire Rope Sense Saves Wire Rope$$$

The efficiency of Wire Rope depends not only upon the care it receives in service but fundamentally on the suitability of the rope for the operating conditions. ¶ We supply Wire Ropes of the very best quality and of the proper construction for the proposed use. Our selection is the result of over 50 years' experience in building excavating equipment. ¶ Do not experiment — we have done that for you.

Are you insuring your machine against a shut-down by keeping a spare rope on hand?

Write for Bulletin S-31

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
Specialty Department
South Milwaukee, Wisconsin

A Bucket Cleanout

PATENT APPLIED FOR

for full efficiency digging in clay-ey soil and gumbo !

The Haiss Bucket Cleanout (patent pending) automatically and unfailingly cleans every bucket as it passes over the discharge point, — no matter how sticky the soil. You can now use the Haiss Excavator anywhere!

Side-on View of the Haiss Bucket Cleanout on a Haiss Excavator.

How it works!

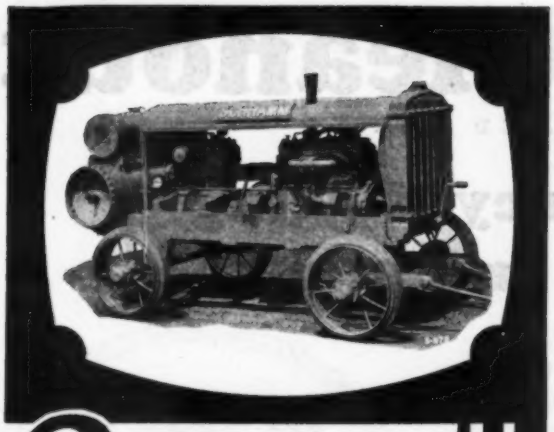
The Haiss Bucket Cleanout is operated by the elevator buckets as they pass over the head sprocket. Husky steel fingers force themselves into and along the leading edge of the bucket and throw out any clay or sticky material which tends to adhere. As the bucket passes over, the set of cleanout fingers automatically reset to engage the next following bucket. This motion is spring actuated and shock-absorber cushioned. It times perfectly and without shock. Ball-bearing shaft mounting.

The Bucket-Cleanout is optional equipment on the Haiss Excavator, required only where clay-ey conditions are encountered. On machines so equipped it can be used when necessary and rendered inoperative at other times.

HAISS EXCAVATOR

GEO. HAISS MANUFACTURING COMPANY INC. 144th Street and Park Ave., New York.

In writing to Geo. Haiss Mfg. Co., Inc., please use post card bound in the center of this number.



Dependable . .
Efficient . .
Economic . .
Sturdy . .

AIR COMPRESSORS

Schramm

WEST CHESTER, PENNSYLVANIA

Shots From the Firing Line — *Continued*

Missouri Notes

An interesting development in hauling methods is used by the **Centropolis Crusher Company of Kansas City,** in their underground quarry. Eliminating car delay and the complicated trackage system required in underground quarries because of the pillars, this organization uses Caterpillar "Thirties" with Athey Truss Wheel-mounted trailers of 10-ton capacity, side-dump Easton-Phoenix bodies carrying 4 to 5 cubic yards.

Southern Notes

By W. W. WHORLEY

Grasser Contracting Company has made excellent progress with its newest Bucyrus-Erie Class 230 dragline on its Pikes Peak job.

Lewis Chambers Construction Company has also made very good progress on the Upper New Texas levee where it is using a Bucyrus-Erie Class 230 steam.

GREDAG . . . .

LUBRICATION

GREDAG is the ideal lubricant for equipment that is being placed in service after a period of shut-down. It removes the danger of scoring from bearings that have been exposed to the weather. It reduces depreciation of gears, chains and cables.

GREDAG Provides Insured Lubrication

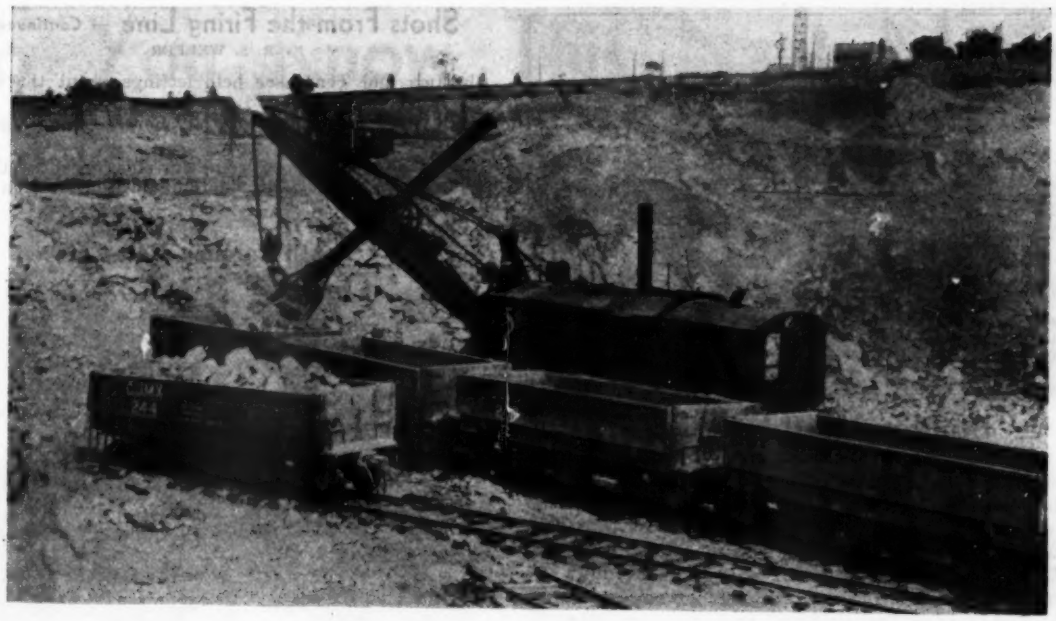
The very fine particles of *pure*, electric furnace graphite quickly develop a graphite filled bearing surface with an adhering film of grease that prevents metal to metal contact.

There is a grade of GREDAG for every class of lubrication, either protected or exposed.

Write for Literature

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide and Carbon Corporation
Branch Sales Offices
NEW YORK PITTSBURGH CHICAGO SAN FRANCISCO

PARTNER. For the excavator who wants to cut down digging and handling costs, a Hayward Bucket is sure to prove itself a useful partner. Address The Hayward Company, 52-54 Church Street, New York, N. Y.
Hayward Buckets



DIFFERENTIAL

Double Fulcrum

AIR DUMP CARS

Differential Construction insures a long life, uninterrupted by annoying and costly breakdowns, even under the severest loading conditions.

Differential Design insures quick, clean dumping of any class or size material and casting the load well away from the track.

The Differential Double Fulcrum principle insures complete safety, stability, and freedom from spillage.

Differential Air Dump Cars are made in standard sizes of 22 cubic yard, 27 cubic yard, 30 cubic yard, 36 cubic yard, and 50 cubic yard level load capacities.

Differential Air Dump Cars, Differential Mine Cars, Differential Locomotives and other Differential haulage equipment can satisfy any probable haulage requirement. Submit your haulage problem to us and let us recommend equipment for low haulage costs.

THE DIFFERENTIAL STEEL CAR CO.

FINDLAY, OHIO

In writing to The Differential Steel Car Co. please use post card bound in the center of this number.

Building a 40 Foot Fill

Raising this 40 foot fill on a railroad construction job, without the use of jacks—or the building of a trestle, is just one of the many instances where the Track Machine has been used at a great saving in time and labor. Disposing of overburden at quarries and mines, or any similar job where a track gang is maintained for shifting and raising, this machine and a few men will do the job quickly and soon pay for itself out of expense ordinarily required for men working with bars and jacks.

NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED
TRACK SHIFTER

HUG

Load Distribution

CORRECT load distribution is an important factor in all transportation equipment. It means speed and profit in the handling of the load. It means even wear and longer life for the truck.

Equalized load distribution has been attained in Hug Roadbuilder Trucks by providing a short wheelbase making possible a short turning radius, and distributing the weight over all four wheels. This feature and many other Hug features have established Hug reputation and account for the growing demand for Hug Roadbuilder Trucks wherever Hug performance is known.

THE HUG COMPANY, Highland, Ill.

Shots From the Firing Line — *Continued*

By R. S. WELFER

Alabama and Tennessee held lettings about the middle of January.

South Carolina expects to let more grading early in February.

Tom Aiken, operator, called at our office recently. He had just finished a job for the MacDougald Construction Company in Tennessee.

South Carolina Notes

B. B. Bone seems to be "up in the air." Mr. Bone is plant engineer at the G. L. Anderson Brick Yards, Cheraw, South Carolina. This Type B Bucyrus-Erie steam shovel will celebrate its tenth anniversary in the near future. "Hard clay digging, year after year, has not bothered this sturdy steamer," declare both Operator Bennett Coble and Engineer Bone.

Pacific Northwest Notes

By W. J. BRETT

Jimmy Groat, who builds railroads for the Crown Willamette Paper Company of Cathlamet, Washington, returned to Portland for the holidays. He has finished a very successful season with his Diesel + Air, which he has been operating since last May. Jimmy states that his 1½-cubic yard shovel consumes 2½ gallons of Diesel oil per hour and up to date he has not had to buy any repairs.

Frank Sturgel of the Union Construction Company, together with Mr. Marks, another member of the company, was in Portland recently, and with C. R. Vaughan and Jimmy Groat were guests of the Clyde Equipment Company.

Washburn & Hall of Portland will regrade and surface the Oregon Caves Highway near Grants Pass. **Kerne & Kibbe** will surface 10 miles of the Roosevelt Highway in Lane County. **W. H. Puckett Company** of Boise, Idaho, will regrade and surface the John Day Highway in Grant County. **Saxton & Looney** of Corvallis, Oregon, will resurface 14 miles of the Roosevelt Highway between Lakeside and North Bend.

Most of the **105 County Commissions of the State of Oregon** met in annual convention in Portland, December 11 to 13, inclusive, when road problems were discussed with the State Highway Commission, and several talks were made, telling how to make Oregon's good county roads better.

Sherk Brothers Company is now at Wallula, Washington, getting ready to receive their Bucyrus-Erie Diesel + Air 1¼-cubic yard shovel, to move 246,000 cubic yards for the State Highway Department.

MEETING PLACE OF CAPITAL AND LABOR

THE KOENIG LABOR AGENCIES

Established 1875

ST. LOUIS
612 Walnut Street
Main 2766 and 2767

KANSAS CITY
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HELP OF ALL KINDS FURNISHED FREE

Do You Know This New Marvel In Elevating Grader Efficiency?

The New Western No. 6

The design of the Western No. 6 is along entirely new lines by which a greater yardage can be moved than ever before. The "backbone" of the frame is a 10-inch steel tube that no possible strain can spring. This, plus *three point suspension,* eliminates all distortions and all floating belt troubles.

The elevator is driven by a gasoline engine mounted on the machine.

The No. 6 is so enormously efficient that, under favorable conditions, it has loaded 17,800 cubic yards in 60 hours. This is an average of approximately 300 cubic yards of pay dirt an hour, the tractor working in second speed.

Write for Bulletin 31-CK, just off the press, which tells of this marvel in elevating grader efficiency.

Western Wheeled Scraper Company

Dump Cars and Grading Equipment

AURORA, ILLINOIS, U. S. A.

WESTERN

In writing to Western Wheeled Scraper Co. please use post card bound in the center of this number.

Modern Mining Methods Reveal Truax-Traer Among Nation's Leaders

(Continued from Page 67)

and smooth and this outfit follows closely behind the stripper, shoving the thin layer of dirt left by the big shovel over against the spoil pile.

165 to 170 16-yard Sanford-Days per shift loaded with Bucyrus-Erie 75-B

The 4½-foot coal seam is loaded behind the stripper by a Bucyrus-Erie 75-B electric shovel with a 3½-cubic yard special coal loading dipper. The crew for this machine consists of one operator, one oiler and one pitman. On the day of our visit, Operator A. T. Wurtzburger had loaded out 80 of the Sanford-Days at noon, averaging about 16 tons each, a total of approximately 1,280 tons in four hours, which is considered fair production. The record output for the half-shift period is, however, 97 cars, or 1,552 tons. Mr. Atchley tells us that Operator Wurtzburger has no trouble turning out 165 to 170 cars a shift if they can keep the cars under the shovel.

The 4½-foot coal seam is loaded out by this Bucyrus-Erie 75-B electric, which has heaped up as many as 97 Sanford-Days with 16-ton loads in a half shift of four hours.

The coal is blasted for the shovel, two Gardner-Denver jackhammers being used in the pit, working from a small portable Ingersoll-Rand compressor. Only one of the jackhammers is used steadily, being usually able to keep ahead with holes, which are drilled on about 6-foot centers. Du Pont 40% is used for blasting the coal, just enough being loaded to crack the coal seam.

It is almost a mile from the pit to tipple. Track is 36-inch gauge and runs down hill from pit to plant on a grade of approximately one-half of one per cent.

Coal is hauled with 15 Sanford-Day 15-ton automatic dump cars hauled by three Plymouth 20-ton gasoline locomotives. The cars carry sideboards and average 16 tons to the car. Five cars are hauled per train. The management is very well pleased with both cars and locomotives, which are giving excellent service. Gas consumption for the Plymouths averages about 35 gallons each per day. Their tanks are filled at a regular Red Crown filling station which Truax-Traer have installed alongside the track near the tipple. One "skinner" handles each train, there being no brakeman or switchmen required as the tracks are all equipped with automatic spring switches which carry the trains through on the proper tracks at all times.

The tipple is modern in every respect and has the most up-to-date facilities for producing the best quality of clean, well-graded coal. It was built by the Pittsburg Boiler and Machinery Company. Refuse from the tipple is loaded into 6-yard Western cars and hauled to the pit, where it is dumped into the mined-out area along the track and buried by the next cast of overburden. On the day preceding our visit, the plant loaded out 2,200 tons of coal. It has handled as high as 2,600 tons.

Empties are spotted into the tipple-loading trucks by gravity. The coal is loaded from the tipple to gondolas which run down grade to their proper place in the storage yard by gravity. The storage yard holds about 80 cars.

Coal from the St. David mine, which is located on the C. B. & Q., goes to the north and west largely to the railroad market. The office, a well-built brick structure, is pleasantly located on the crest of a hill, overlooking the tipple and yards. Adjacent to the tipple itself are a well-built brick wash house and oil house, a large warehouse and well-arranged shops for handling repairs and general maintenance work.

Left: Pulling a train of Sanford-Days past the shop on the way to the pit. Center: Looking toward the tipple with the load storage yard at the left, one sees the office through the trees on top of the hill. Right: A Red Crown filling station just below the shops refuels the Plymouths.

In charge at the St. David pit are A. H. Hayes, Superintendent; A. E. Junell, Assistant Superintendent and Tipple Foreman; P. E. Atchley, Pit Boss, and Roy Hayden, Office. Operators on the Bucyrus-Erie 750-B are Bill Ayers, Bill Scott and Jim Horton; on the 75-B, Andy Wurtzberger.

Spanning the Allegheny River

(Continued from Page 73)

the concrete from the paver and emptied it directly into the forms.

Before proceeding with the center pier, the paver was moved out over the East abutment and the conveyor moved a similar distance. Two Insley 22-cubic-foot cars on industrial track carried the concrete from the head of the conveyor to the forms. Two hundred five yards of concrete were poured in six hours.

The industrial track was next extended to the West Pier and a passing siding added. Another car was added to take care of the increased haul.

Looking across at the bridge construction from where the Type 1035 Bucyrus-Erie was excavating for the east abutment.

For the West Abutment, the paver was moved across the river onto the embankment and the concrete for this structure was emptied directly from the mixer into the forms.

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

DRAGLINE OPERATOR

12 years' experience on gasoline and steam draglines of several makes. Last two years on Northwest gas machine. Can handle a machine smoothly and get results. Good references. Box 1101.

CRANE-CLAMSHELL OPERATOR

Experienced on clamshell and cranes. Have own set of tools and can handle any type of overhauling job. Reliable references furnished. Box 1102.

DRAGLINE-SHOVEL OPERATOR

16 years' experience on Bucyrus-Erie, Osgood, Thew, P.&H. and Northwest draglines, shovels, trenchers and cranes, steam, Diesel and gasoline powered. Experience covers years on highway, railroad, rock quarry, drainage, and materials handling. Prefer operating Bucyrus-Erie machine anywhere. Can do own repairing and furnish reliable references. Present location, Ohio. Box 1103.

SHOVEL OPERATOR

18 years on steam and gasoline machines in stripping fields, ore and asphalt mines, highway and railroad grading. Can do own repair work and furnish A-1 references. Willing to go anywhere. Present location, Tennessee. Box 1104.

DRAGLINE-SHOVEL OPERATOR

10 years on Bucyrus-Erie, Monighan and Marion machines, steam and gasoline powered. Experienced in stripping and loading coal and highway grading. Willing to go anywhere in U. S. A. Reliable references furnished. Would consider firing job. Present location, North Dakota. Box 1105.

SHOVEL OPERATOR

Experienced on highway and quarry excavation and drainage work. Prefer operating Bucyrus-Erie shovel. Willing to go anywhere in U. S. A. Can do own repairing and furnish excellent references. Present location, Mississippi. Box 1106.

SHOVEL OPERATOR

14 years' experience on Bucyrus-Erie, Osgood, Marion and Thew machines, on basement, highway, and quarry excavation. Can guarantee satisfaction. Prefer operating Bucyrus-Erie machine. Can do own repair work and furnish good references. Present location, Virginia. Box 1107.

DRAGLINE OPERATOR

Experienced on highway, levee construction and drainage work on steam and gasoline machines. Can do own repairing and furnish excellent references. Present location, Louisiana. Box 1108.

CLAMSHELL-CRANE-SHOVEL-OPERATOR

8 years' experience on highway and basement excavation and on materials handling jobs. Prefer working in East, but would go anywhere in U. S. A. Can do own repair work and furnish A-1 references. Present location, Vermont. Box 1109.

CLAMSHELL-DRAGLINE-SHOVEL OPERATOR

All-around operator on gasoline, steam, Gas+Air and electric machines. 25 years' experience includes coal stripping, quarry excavation and highway construction work. Will go anywhere in U. S. A. Can do own repairing and furnish good references. Present location, Missouri. Box 1110.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

Have handled Bucyrus-Erie steam and gasoline machines for 12 years on railroad excavating, quarry work and basement excavating. Prefer operating same make machine anywhere in country. Can do own repairing and can furnish A-1 references. Located in New Hampshire. Box 1111.

SHOVEL OPERATOR

20 years' experience with steam machines on railroad construction and stripping work. Prefer operating a Bucyrus-Erie machine anywhere in U. S. A. Can handle all repairing and furnish A-1 references. Located in Ohio. Box 1112.

CRANE-SHOVEL-CLAMSHELL OPERATOR

Have handled steam and gasoline machines for 14 years, on grading, gravel pit, mine, quarry and shale excavating. Willing to go anywhere in U. S. A. Can handle own repairing. A-1 references. Located in Pennsylvania. Box 1113.

DREDGING SUPERINTENDENT

Qualified to take full charge of dredging operations. 20 years' experience on drainage and levee work. Willing to go anywhere in U. S. A. Can do own repairing and furnish reliable references. Located in Minnesota. Box 1114.

CLAMSHELL-DRAGLINE OPERATOR

6 years' experience on stripping and loading operations. Prefer operating Bucyrus-Erie dragline anywhere. Can make own repairs and furnish good references. Present location, South Carolina. Box 1115.

SHOVEL OPERATOR

16 years' experience on Bucyrus-Erie 50-B, 30-B, D-2, Gas+Air machines on highway, railroad and quarry excavating. Willing to go anywhere in the U. S. A. Expert repairman. Can furnish A-1 references. Located, Minnesota. Box 1116.

SHOVEL OPERATOR

14 years' experience on steam and gasoline Marion, Northwest, and Thew shovels, draglines and cranes on highway, railroad grading and in quarries. Prefer Northwest or Bucyrus-Erie anywhere in U. S. or Canada. Can do own repair work and all overhauling. Single and sober. Box 1117.

DRAGLINE-SHOVEL OPERATOR

Have operated Bucyrus-Erie Gas+Air, steam, gasoline and Diesel machines for 8 years on quarry, highway and building work. Willing to go anywhere in U. S. A. Can do own repairing and furnish reliable references. Located in West Virginia. Box 1118.

JOHNSTON

Sixty-five Years of Quality Equipment

Johnston Boilers

The fact that Johnston Boilers are to be found today in almost every country in the world is proof that a hard and fast policy to produce quality units at honest prices has made a host of friends for the Johnston Boiler Company.

Johnston Boilers are built to meet all requirements, and are fully guaranteed.

JOHNSTON BROTHERS, Inc.
Ferrysburg, Mich.
Box No. 310

The Lackawanna Steel Construction Company of Buffalo erected the steel superstructure. The concrete deck and two course concrete pavement on the approaches will be poured this year.

The State's interests were looked after by Walter J. O'Brien, ably assisted by Leo Harrison and C. A. Fronapple. Frank Roe supervised the driving of all piles and cofferdams.

We are indebted to Walter O'Brien and "Herb" Murphy for this extremely interesting data, and we believe that they showed fine judgment in the handling of this job.

Highway Forecast 1931

(Continued from Page 79)

Chosen (Korea)

At the time of the annexation of Chosen (Korea) by Japan in 1910, there were practically no modern highways in this country. Since that time a comprehensive highway system has been developed through the co-operation of national and local engineering officials. At the end of 1928, according to the latest available Government statistics, 10,767 miles of first, second, and third class highways had been completed, as part of a projected total of 14,929 miles. The roads are classified according to width as first class, 24 feet or more; second class, 18 feet or more, and third class, 12 feet. Practically all the above mentioned mileage is for earth or gravel roads.

With the steadily increasing demand for automotive transportation in Chosen, as evidenced by the increase in the number of automotive vehicles from 1,276 in 1925, to

Wire Rope
Rope Sockets
Rope Clips
Hoisting Chain
Injectors
Brake Linings
Wood Blocks
Asbestos Fabric
Asbestos Blocks
Fire Box Arches
Fuel Hoists
Dipper Trips
Steam Fans
Rail Clamps
Rail Chairs
Rails
Bridles
Suction Hose
Oil Pumps
Drain Valves
Jacks
Portable Electric Blowers
(for cleaning electrical machinery)
Hand Hoists
Asbestos Packings
Flexible Metallic Packings
Moulded Metallic Packings
Oil Burning Equipment
Power Transmission Cable
Dragline Rollers

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
Specialty Department
South Milwaukee, Wisconsin

VITAL interest in the successful performance of machines bearing their name plus over 50 years of experience in servicing excavating equipment in all parts of the world plus careful shop, laboratory and field tests of all similar equipment plus unequalled service facilities—all these are behind the accessories and supplies listed. Look over the items and write for prices and information on your requirements.

4,704 at the end of July, 1930, the roads throughout the peninsula continue to be widened and improved.

Sweden

The Board of Roads and Waterways has applied to the Riksdag for 5,800,000 Crowns ($1,554,400) for the building of State highways during 1931. In addition, 1,500,000 Crowns ($402,000) are wanted for the construction of small village roads. The grant for this year was 5,000,000 Crowns ($1,340,000) and 1,200,000 Crowns ($321,600) respectively. According to the provincial government's 3-year budget plan for the period 1931-33, a total of 15,524,000 Crowns ($4,160,432) are required for the construction of highways and roads. For the construction of private by-roads, the Board applied for 600,000 Crowns ($160,800) which is an increase of 150,000 Crowns ($40,200) over last year's grant.

Italy

Economic depression is not merely local, but national, and to offset in part the unemployment, the government has wisely decided on a program of public works, assigning to each Province a certain program which will call for the expenditure of fixed sums and guarantee employment to a number of workers. This enlarged program went into effect on September 15th. We have reports on the following road works initiated: Province of Arezzo—$28,553; Province of Bologna—$3,842; Province of Forli—$63,400.

Panama

A $4,000,000 loan, most of which is for highway purposes, has been authorized by the Assembly and approved by the President of Panama. The following road projects are listed in the decree for construction: David in Chiriqui Province and Bocas del Toro; Las Tablas to Pedasi; and from Colon to Portobelo. It has been stated that the Government will not attempt to obtain the loan at once, due to the unfavorable local fiscal situation.

New Zealand

The Public Works Estimates for highways presented in the House recently proposed £320,000 ($1,557,280) less expenditure on highway construction and improvement this year, and £14,750 ($71,781) increased allocation for maintenance as compared with last year. The estimated net appropriation for construction and improvement is £930,000 ($4,525,845) as compared with £1,250,000 ($6,083,125) noted last year, of which £1,224,555 ($5,959,187) was expended.

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Small Shovels
Under 2 yards

MARION ELECTRIC SHOVEL, Model No. 36. **MARION STEAM SHOVEL,** Model No. 36. Location Central Ohio. Box 1204-A.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, equipped with 21-foot boom, 18-foot dipper handle, boom hoist, ¾-cubic-yard dipper; sold new 1924; just completely overhauled; price reasonable; located vicinity of Chicago. Box 41-SS.

NORTHWEST SHOVEL, model 105, caterpillar mounted. 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

RECONDITIONED TYPE B ERIE HIGH LIFT SHOVEL, shop number 3175, mounted on spur gear caterpillars, equipped with 19-foot 9-inch boom, 16-foot dipper handle, ¾-cubic-yard dipper, boom hoist, two-speed travel mechanism. Box 87-SS.

ONE 18-B BUCYRUS, ⅞-yard dipper on full revolving caterpillars. Box 505-A.

RECONDITIONED TYPE-A ERIE STEAM SHOVEL on caterpillars, ⅝-cubic-yard dipper, 16-foot boom, 13-foot dipper handle, boom hoist, Massachusetts boiler. Machine thoroughly inspected, worn parts replaced. Guaranteed to be in first-class operating condition. Will rent or sell. Box 37-SS.

BYERS "BEAR CAT" COMBINATION 1½-CUBIC-YARD

Shovel and clamshell crane; shop number about 2975; new 1926. Equipped with 34-foot boom. Machine has had good care and is in good working order. Located upper Michigan. Box 137-SS.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE D-2 DIESEL DRAGLINE, 45-foot boom. Also 1-yard dragline bucket and Delco Lighting plant. Would rent for long period with option of purchase. Located Southern Indiana. Box 130-SS.

TWO TYPE "B" ERIE STEAM MACHINES, mounted on "cats," ⅝-cubic-yard dippers, shop numbers 2300 and 2301, 19-foot booms and 16-foot dipper handles. Box 83-SS.

31-B STEAM SHOVEL, Number 4880, in very good condition; priced right; located Pittsburgh, Pennsylvania. Box 128-SS.

BUCYRUS-ERIE GAS + AIR SHOVEL, shop number approximately 9800, equipped with 22-foot 6-inch boom, 16-foot dipper handle, one-cubic-yard inserted tooth dipper, power boom hoist. Mounted on a single shaft caterpillar-type mounting. Has moved only 40,000 yards of material. Located vicinity of Poughkeepsie, New York. Box 96-SS.

REBUILT GA-2 ERIE SHOVEL mounted on new single shaft caterpillar, 1-cubic-yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

TYPE "A" ERIE STEAM SHOVEL, shop number about 1900, caterpillar mounted, 16-foot boom, 14-foot dipper handle, ⅝-cubic-yard dipper, boom hoist. In first-class condition. Located Chicago vicinity. Priced to sell. Box 69-SS.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted equipped with 21-foot 3-inch boom, 18-foot 6-inch dipper handle, power boom hoist, ¾-cubic-yard dipper; in excellent condition; just installed $400 worth of repairs. Located vicinity Kansas City. Box 80-SS.

NORTHWEST DRAGLINE, Model 105, shop number in 2000's; 45-foot boom, fairlead and no bucket. In good condition, **$5000.00.** For further particulars address communications to Box 114-SS.

OSGOOD GASOLINE DRAGLINE, 1¼-cubic-yard bucket, 22-foot boom, 16-foot dipper handle, manganese front dipper, 4-cylinder Le Roi motor, 125 h.p., 45-foot boom, fairlead, no bucket, **$6000.** For further particulars address communications to Box 115-SS.

P. & H. SHOVEL, Model 600, 21-foot boom, 14-foot dipper handle, 1-cubic-yard bucket, on caterpillars, purchased November 1928, shop number 2989—machine is now being thoroughly overhauled and can be demonstrated in about a week. Box 116-SS.

ONE P. & H.-204 ½-CUBIC-YARD COMBINATION GAS SHOVEL AND CLAMSHELL, shop number about 2220. New 35-foot clamshell boom, and ½-cubic-yard Owens Bucket. Machine is in good condition and has had the best of care. Can be inspected in operation in Milwaukee. Priced to sell quickly. Box 99-SS.

MARION MODEL 37 ELECTRIC SHOVEL suitable for 3-phase, 60-cycle, 440 volts, equipped with 32-foot boom, 22-foot handles, and 1¼-cubic-yard dipper, on caterpillar mounting. Machine in very good condition. Located near Pittsburg, Kansas. Price reasonable. Box 90-SS.

ORTON SHOVEL, new 1928. 16-foot 4-inch boom, 12-foot dipper handle. ⅝-cubic-yard dipper. Located Seattle, Washington. Box 100-SS.

RECONDITIONED TYPE-B SHOVEL, number 3175, spur gear caterpillar-mounted, 19-foot 9-inch boom, 16-foot dipper handle, ¾-yard dipper, power boom hoist. Located Detroit. Price right. Box 132-SS.

REBUILT BUCYRUS-ERIE TYPE B-2 SHOVEL, shop number about 4000, spur gear caterpillar-mounted, 19-foot 9-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper and power boom hoist. Fully guaranteed. Box 133-SS.

NORTHWEST GASOLINE DRAGLINE, 40-foot boom, 1-cubic-yard bucket. In good mechanical condition. Machine about 4 years old and working every day on drainage work. Located in Northern Indiana. Box 145SS.

USED NORTHWEST SHOVEL, 24-foot boom, 15-foot dipper handle, 1-cubic-yard dipper, equipped with 4-cylinder, 6¼ in. x 8¼ in., Atlas Diesel Engine. Good operating condition. Located San Francisco. Price right. Box 135-SS.

MARION TYPE 32 COMBINATION DRAGLINE AND SHOVEL, shop number 5683, dragline boom 50 feet, one-cubic-yard drag bucket included. Shovel boom 24 feet, dipper handle 17 feet 6 inches. Manganese front dipper 1¼ cubic yards. Machine purchased new October 1926, original cost $17,500. Will sacrifice and offer terms to reliable party. Located in vicinity of San Antonio, Texas. First-class condition. Address Box 1004-A.

FOR SALE

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 yards
Continued

ONE P. & H.-400 ¾-CUBIC-YARD GAS SHOVEL—shop number about 3650, equipped with oversize motor and reinforced boom. Machine is one year old, and has seen very little service. Located in Southern Wisconsin. Box 98-SS.

MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. Box 82-SS.

TYPE "A" ERIE STEAM CLAMSHELL MACHINE, mounted on traction wheels, equipped with 26-foot boom; to operate ½-yard bucket; shipped new 1921. Located southern Iowa. Priced very reasonable. Box 31-SS.

MODEL 20-B BUCYRUS GASOLINE SHOVEL AND CLAMSHELL MACHINE, shop number in 4800 series; mounted on full caterpillar; equipped with high lift gooseneck shovel boom and ⅞-cubic-yard dipper, also 36-foot clamshell boom and ¾-cubic-yard clamshell bucket. Machine in good working condition. May be inspected at Omaha. Reasonably priced. Convenient terms may be arranged. Box 55-SS.

BUCYRUS 30-B STEAM MACHINE, shop number 3578. Has seen approximately eight years' service. Equipped with new boom and boiler. Reasonably priced. Located New York State. Box 72-SS.

MARION MODEL 7 ONE-YARD STEAM SHOVEL. Shop number around 6000. Good condition. Price $5,000. Box 101-SS.

TYPE "B" ERIE HIGH-LIFT SHOVEL. Shop number about 1115. 19-foot 6-inch boom, 16-foot dipper handle, ¾-cubic-yard bucket, Caterpillar mounted. In good operating condition. Cheap. Location Central Illinois. Box 104-SS.

MODEL B-3 SPEEDER ½-cubic-yard shovel, 18-foot boom, 16-foot dipper handle, dragline equipment with 35-foot boom and ½-cubic-yard dragline bucket; serial number about 880, new June 1929. Has worked approximately 12 months. In good condition. Equipped with heavy-duty Hercules high altitude engine. Located Central Colorado. Price on application. Box 139-SS.

BYERS ½-CUBIC-YARD MACHINE, 30-foot boom with 5-foot center extension section, ½-cubic-yard Page bucket and clamshell equipment, but no clamshell bucket. Bought new about May 1929. In use about 15 months. Located in Eastern Colorado. Box 140-SS.

KOEHRING ⅝-CUBIC-YARD caterpillar-mounted shovel with additional 40-foot clamshell boom. Box 141-SS.

BAY CITY SKIMMER, ½-CUBIC-YARD, shop number 552, Model 10-B. Shipped early 1926, cost $7,150 new, asking price now is $2,000. Box 142-SS.

KOEHRING, FULL REVOLVING GASOLINE SHOVEL, mounted on caterpillars, Wisconsin Motor, 19-foot 5-inch boom, 16-foot dipper handle, ¾-cubic-yard dipper, recently rebuilt and in good working condition, located Utica, N. Y., $5,000. Five years old. Box 143-SS.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE 1030 DIESEL DRAGLINE, 40-foot boom, also ¾-yard Class "C" drag bucket, also extra high lift rope crowd shovel attachment. Would rent for long period with option of purchase. Located Western Pennsylvania. Box 131-SS.

MARION STEAM SHOVEL, MODEL No. 21, high lift boom and forward drum, boiler just retubed, location near Baltimore, in excellent condition. Price $3,800.00. Address Box 1101

RECONDITIONED TYPE B SHOVEL, shop number approximately 3100, caterpillar mounted, ¾-cubic-yard inserted tooth dipper, 19-foot 9-inch boom, 16-foot dipper handle, power boom hoist. Guaranteed. Will rent with option to purchase. Located Western Pennsylvania. Price on application. Box 40-SS.

OSGOOD HEAVY-DUTY, GASOLINE-DRIVEN, 1-YARD COMBINATION DRAGLINE-CLAMSHELL MACHINE, on cats, equipped with 40-foot boom, 6-cylinder Beaver motor, starter and lighting plant operating from generator. Machine 2 years old. Located Central Illinois. Priced to sell. Address Box 1106.

OSGOOD STEAM SHOVEL, 1¼-cubic-yard dipper, caterpillar mounted. Shop number 1397, priced f. o. b. cars, Summittville, Tennessee. Box 86-SS.

ERIE TYPE "GA-2" GAS + AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of the Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

UNIT ½-CUBIC-YARD GAS SHOVEL, full revolving. New June 1930. In excellent condition throughout and priced exceptionally low. Located in Northern Wisconsin. Box 127-SS.

Small Draglines
Under 2 yards

30-B DIESEL DRAGLINE with 40-foot boom and 1-cubic-yard bucket located in Alabama. Box 91-SD.

SARGENT DRAGLINE with 45-foot boom, 1⅛-cubic-yard Page bucket on cats. Machine in good working condition. Located in Central-Eastern Illinois. Price $3500.00. Address Box 1103.

MARION MODEL 261 DRAGLINE with shovel equipment. Shop No. 3277. Truck mounted. Recently overhauled and rebuilt. In excellent condition. Located near Minneapolis, Minnesota. A number of extra parts with the machine. Priced very reasonable for immediate sale. Address Box 606-A.

30-B DRAGLINE, shop number about 4470, mounted on caterpillars with 40-foot boom and 5-foot extension, 1-cubic-yard Page Class-C bucket and electric light plant. Good working condition, location Detroit District, and ready for prompt delivery. Box 121-SD.

FOR SALE

MODEL 208 P. & H. DRAGLINE (shop number about 1760), equipped with 45-foot boom, 1-yard drag bucket, including about $200 worth of repairs; located vicinity of Indianapolis. Priced to sell quick. Address Box 601.

MODEL 206 P. & H. DRAGLINE, caterpillar-type mounting, 38-foot boom and 5-foot extension. Recently overhauled and new Waukesha engine installed. Can be inspected in operation in Omaha, Neb. Box 79-SD.

Small Clamshells and Cranes
Under 2 yards

MODEL T ORTON GAS-DRIVEN CLAMSHELL MACHINE, caterpillar mounted, equipped with 35-foot boom, no bucket. Machine about three years old and in good repair; working every day. Shop number near 47,590. Priced to sell. Located in Southwestern Michigan. Box 18-SCC.

BYERS GASOLINE ONE-HALF SWING, 30-FOOT BOOM CLAMSHELL EXCAVATOR, including ½-cubic-yard Williams clamshell bucket and trench hoe equipment, powered with Hercules motor. Machine about 4½ years old. Price complete, machine f. o. b. present location vicinity Buffalo, New York, $2,500.00. Box 66-SCC.

If You Do Not Find What You Want Listed—Write Us

The Excavating Engineer
South Milwaukee, Wis.

BUCYRUS 30-B STEAM CLAMSHELL-CRANE, 45-foot boom. Good operating condition. Priced reasonable. Located New York. Box 36-SCC.

MODEL 20-B BUCYRUS GASOLINE CLAMSHELL MACHINE AND SHOVEL, shop number in 4800 series; mounted on full caterpillars; equipped with 36-foot clamshell boom and ¾-cubic-yard clamshell bucket; also a high lift gooseneck shovel boom and ⅞-cubic-yard dipper. Machine in good working condition. May be inspected at Omaha. Reasonably priced. Convenient terms may be arranged. Box 55-SCC.

BYERS "BEAR CAT" 1½-CUBIC YARD COMBINATION
Clamshell crane and shovel; shop number about 2975; new 1926. Equipped with 34-foot boom. Machine has had good care and is in good working order. Located upper Michigan. Box 137-SCC.

BROWN-HOIST—40-foot crane and clamshell boom, 1½-cubic-yard clamshell bucket. Cat. mounted. Capacity 20,000 lbs. at 12-foot radius. Price $3,500, location Indiana. Box 144-SCC.

Large Shovels and Draglines
2 yards and over

CLASS 14 STEAM DRAGLINE, mounted on caterpillars, equipped with 60-foot boom. Shop number about 3525. Has seen about two years actual work. Good operating condition. Priced to sell. Box 146LSD.

1 70-C BUCYRUS, 2½ or 3-yard dipper, on caterpillars. Steam.

175-B ELECTRIC BUCYRUS COMBINATION DRAGLINE AND SHOVEL, 3-phase, 60-cycle, 440 volts, 3½-yard bucket. Box 505.

50-B DIESEL DRAGLINE. New September, 1928; shop number about 10,075. Has 60-foot boom, 1¾-cubic-yard bucket; Kohler light plant. Located near New Madrid, Missouri. In excellent condition. Priced very reasonable for quick sale. Box 122-LSD.

175-B BUCYRUS STEAM SHOVEL, equipped with 75-foot boom, 48-foot dipper handle and 4-yard dipper. Machine located near Pittsburg, Kansas, and can be inspected at any time. Condition good; price open. Box 118-LSD.

50-B STEAM DRAGLINE, shop number about 4157, mounted on caterpillars and equipped with 50-foot boom and 13-foot extension. One-yard Williams Clamshell bucket and 1½-cubic-yard Page Class-C drag bucket, boiler retubed and machine equipped with electric light plant. Good working condition, location Detroit District, and ready for prompt delivery. Box 129-LSD.

TWO 70-C SHOVELS, mounted on cats. In good condition. Priced to sell. Address Box 614.